2006/2008

STATUS OF AMBIENT SURFACE WATER QUALITY IN ARIZONA

Arizona's Integrated 305(b) Assessment and 303(d) Listing Report

November 2008

ADEQ
Arizona Department of Environmental Quality

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Contents

The assessment and listing report is divided into the following chapters and appendices:

The Integrated Assessment and Listing Report

2006/2008 Status of Surface Water Quality in Arizona
Arizona's Integrated 305(b) Assessment and 303(d) Listing Report

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Special Note:
ADEQ has combined the 2006 and 2008 305(b) assessment and 303 (d) listing report. No new data was evaluated for the 2008 integrated report. ADEQ anticipates a full update on Arizona waters in 2010.

CHAPTER I
INTRODUCTION AND PURPOSE

Every two years, the Arizona Department of Environmental Quality (ADEQ) is required by the federal Clean Water Act to conduct a comprehensive analysis of water quality data associated with Arizona's surface waters to determine whether state water quality standards are being met and designated uses are being supported. This integrated surface water assessment and impaired waters listing report (2006/2008 Assessment Report) serves three functions.

- Nationally, it fulfills a reporting requirement of the Clean Water Act, and is submitted to the Environmental Protection Agency (EPA), and used to report on national water quality issues and concerns.

- For ADEQ, it provides a mandate to compile environmental data and information from ADEQ's surface water quality protection programs, as well as from other agencies, organizations, and individuals. This comprehensive evaluation of quality of water in Arizona is used to set priorities, allocate resources, and make decisions about land use activities, discharges to the water, future monitoring, and program initiatives.

- For the public, it provides an opportunity to learn about and comment on the status of surface water quality in the state.

Surface Water Assessment Methods and Technical Support

ADEQ has created a separate assessment methods document. It is assumed that the reader will obtain and reference this technical support document (Appendix G) when using the information in this assessment.

The Assessment Methods and Technical Support document provides a description of the assessment process and specific assessment and impaired water listing criteria. It also provides information about the monitoring data and information used in this assessment and Arizona's credible data requirements. The three appendices provide: surface water quality standards used in the assessment, Arizona's TMDL statute, and the Impaired Water Identification Rule.

Report Overview

Chapter I – Introduction and Purpose
Chapter II – Assessments of individual surface waters, organized by watershed
Chapter III – Summary Information
Chapter IV – Action Plan
Annotated References
Appendix A – Look up table of surface waters, indicating the watershed
Appendix B – Assessment Category Lists
Appendix C – Impaired Water Schedule and Prioritization
Appendix D – Critical Conditions
Appendix E – Delisting Impairments
Appendix F – Water Quality Improvements
Appendix G – Surface Water Assessment Methods and Technical Support Document

Although an attempt was made to avoid technical jargon and unnecessary abbreviations, this is a technical report. Acronyms and terms used in the assessment report are defined in the Assessment Methods and Technical Support document (draft 2006/2008).

Changes Affecting the Assessment Process

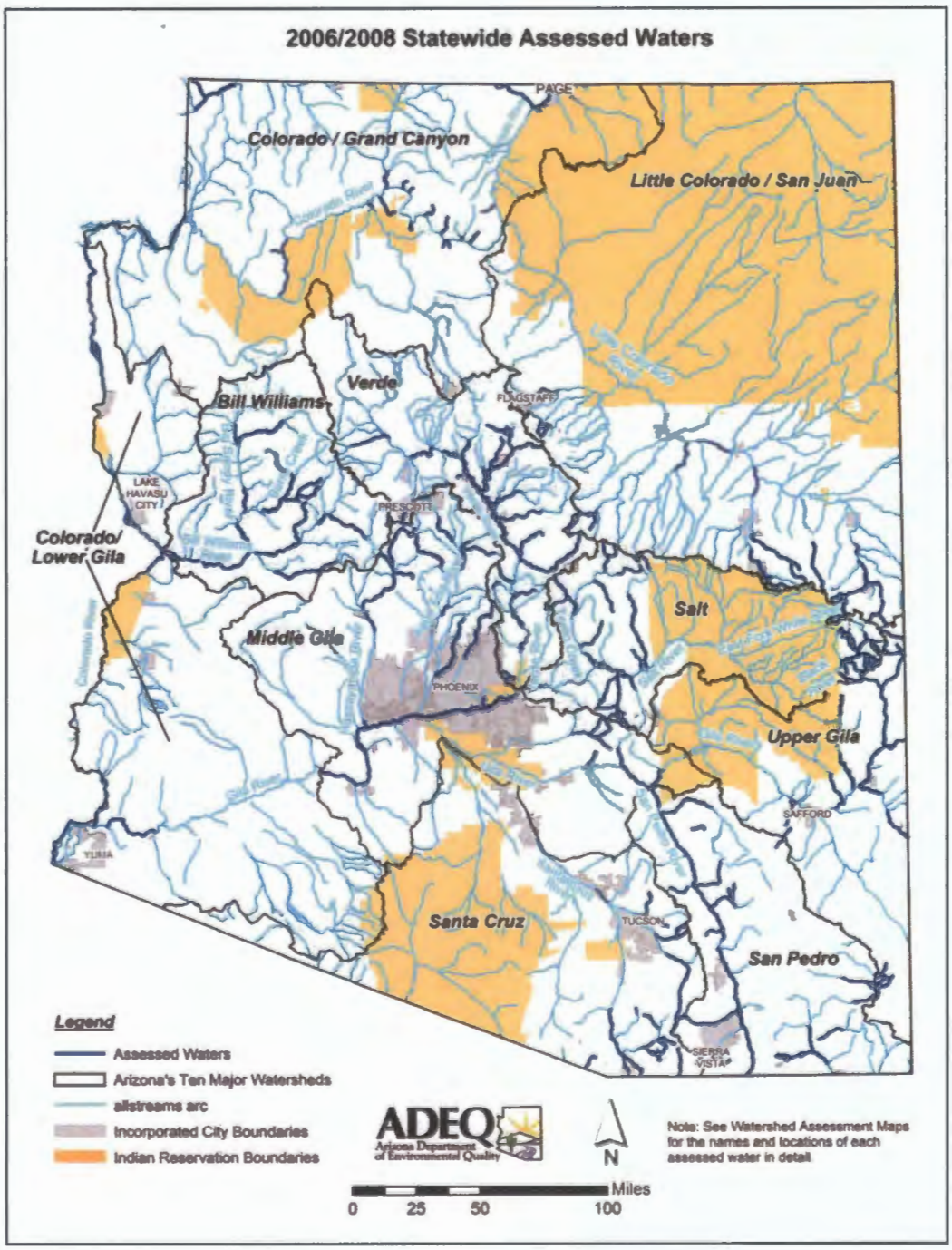
Although ADEQ has proposed revisions to surface water quality standards and the Impaired Water Identification Rule, this assessment does not reflect any changes in either of these rule packages. The assessment is using the same rules that were in effect for the 2004 assessment. However, the following changes and clarifications in federal guidance for completing assessments and listings were incorporated in this assessment:

- Evidence of whether a sample represents a 4-day period, such as hydrologic stability, should be evaluated where available, when using a grab sample to represent chronic aquatic and wildlife conditions.
- An assessment unit can be listed in multiple categories when a TMDL has been completed on some pollutants, but not all pollutants causing impairment.
- When listing an impaired assessment unit in Category 4B, based on alternative pollution control requirements, the state must provide substantial supporting evidence of a regulatory commitment to bringing the surface water into compliance with its standards.

The Surface Water Assessment Methods and Technical Support document describes how these changes were implemented in this assessment. Further revisions of the Impaired Water Identification Rule are required to establish any of these as listing or delisting requirements.

CHAPTER II
WATER QUALITY ASSESSMENTS BY WATERSHED

Assessments are reported alphabetically by individual assessment units in this chapter and grouped by the 10 watersheds, as illustrated on the following map: Bill Williams Watershed, Colorado – Grand Canyon Watershed, Colorado – Lower Gila Watershed, Little Colorado Watershed, Middle Gila Watershed, Salt Watershed, San Pedro Watershed, Santa Cruz Watershed, Upper Gila Watershed, and Verde Watershed.



If the reader is uncertain about which watershed to look in for assessment information, an alphabetical listing of surface waters assessed is provided in **Appendix A**.

Assessment Information

A summary page is provided for each assessment indicating:

- Designated use support and an overall assessment
- Impairment status and pollutant causing impairment (if applicable)
- Monitoring used in the assessment
- Exceedances
- Data gaps and monitoring priorities.

The data gaps and monitoring needs information provides the "Planning List" information used to prioritize future monitoring. Surface waters not assessed are also included in the general planning list, as the lack of data to support assessments is a reason to be placed on ADEQ's internal Planning List.

The reader should refer to the Surface water Assessment Methods and Technical Support document for information concerning the assessment process, determining exceedances, assessment criteria, assessment categories, and monitoring prioritization criteria.

Watershed Information

General background information and a few maps are provided for each watershed to provide some context for the assessments. One map (or a series of maps) shows the assessed surface waters and the monitoring sites used in this assessment. The watershed reports also provide descriptions of TMDLs, water quality improvement projects, and other studies that have been initiated or completed since 2000.

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Bill Williams Watershed Water Quality Assessments

Watershed Description

The Santa Maria River and the Big Sandy River drainages merge at Alamo Lake to create the Bill Williams River, which connects to the Colorado River at Parker Dam. Land ownership is divided approximately as 45% federal, 28% state, and 27% private (no Tribal lands). With only 8,000 people (2000 census), this watershed does not have any large population centers. Open range grazing is the principal land use. A large mining complex is located in the Bagdad area, while historic mine sites are scattered throughout the watershed.

Elevations range from 8,417 feet (above sea level) at Hualupai Peak to 1,000 feet near the Colorado River. Most of the watershed is below 5,000 feet, with low desert fauna and flora (Sonoran Desert - Mohave Desert transition area) and warmwater aquatic communities where perennial waters exist.

Water Resources

There is little precipitation, from 13 inches a year, with an additional inch of snowfall per year in higher elevations, so surface water resources are sparse. Perennial flow in this watershed is frequently interrupted (short segments), even on the larger main-stem rivers. The largest lake, Alamo Lake, covers 11,950 acres; however, only an estimated 1,415 acres are perennial.

An estimate of surface water resources in the Bill Williams Watershed is provided in the following table, based on USGS digitized hydrology at 1:100,000, rounded to the nearest 5 miles or 5 acres.

Estimated Surface Water Resources in the Bill Williams Watershed

	Perennial	Intermittent	Ephemeral
Stream miles	185	655	5035
	Perennial	Non-perennial	
Lake acres	1832	11,950	

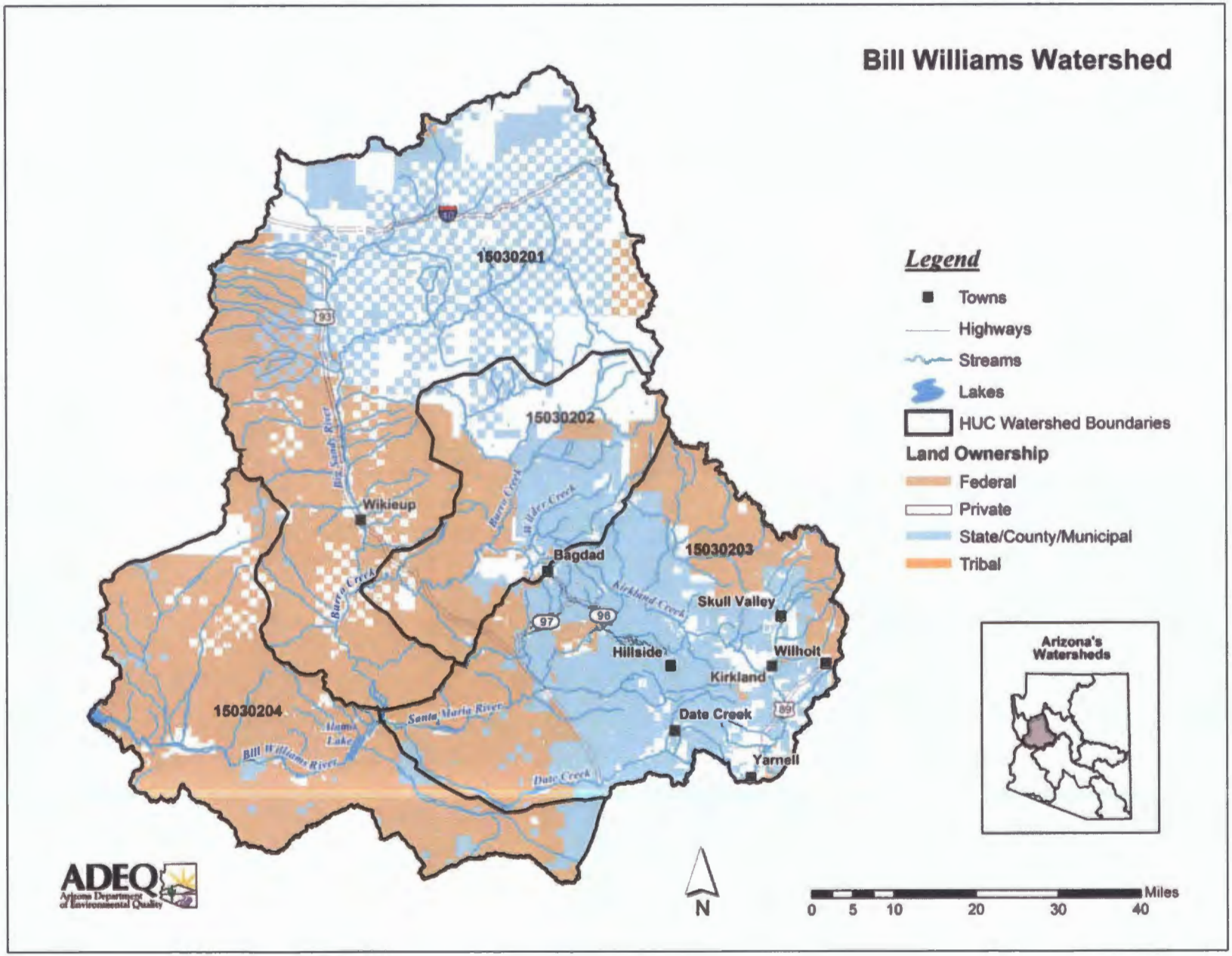
Ambient monitoring focuses on perennial waters; however, special investigations may identify water quality problems on intermittent and even ephemeral waters.

Watershed Partnerships

The following watershed groups are active in this watershed:

- Upper Bill Williams
  The watershed area of concern is approximately defined by Kirkland Creek's drainage area, a tributary to the Santa Maria River. The partnership's mission is to manage and protect water resources – water quality and water rights – and they advocate local control over water resources and land use. For information, contact Sondra Wilkening (secretary) at (928) 925-6434 or westwindsinc@yahoo.com, or Troy Suter at (928) 442-3885.

- Northwest Arizona Watershed Council
  Their area is defined by three groundwater basins: Hualapai Valley (in the Colorado-Grand Canyon Watershed), Sacramento Basin (in the Colorado-Lower Gila Watershed), and Big Sandy (in the Bill Williams Basin). The council's goal is to protect and preserve water resources and educate the public about water issues related to growth and development. The council meets on the 3rd Wednesday of the month in Kingman, AZ. For information, contact Elmo Roundy (928) 757-2818 or Earl Engelhardt at (928) 692-1068 or imspirit@kingmanaz.net.


Bill Williams Watershed
15030201
15030202
15030203
15030204
Wikieup
Bagdad
Skull Valley
Hillside
Kirkland
Wilhoit
Date Creek
Yarnell
Big Sandy River
Burro Creek
Santa Maria River
Bill Williams River
Alamo Lake
Date Creek
Kirkland Creek
Legend
Towns
Highways
Streams
Lakes
HUC Watershed Boundaries
Land Ownership
Federal
Private
State/County/Municipal
Tribal
Arizona's Watersheds
ADEQ
Arizona Department of Environmental Quality
N
Miles
0 5 10 20 30 40

Special Studies and Water Quality Improvement Projects

Total Maximum Daily Load Analyses – The following TMDL analyses have been completed, are ongoing, or are scheduled to be completed in this watershed. Further information about the status of these investigations or a copy of the TMDL, if completed, can be obtained at ADEQ's website: www.azdeq.gov.

- Boulder Creek, from Wilder Creek to Butte Creek, near Bagdad, is not attaining water quality standards due to arsenic, beryllium, copper, manganese, mercury, zinc and low pH. Boulder Creek, from Butte to Copper Creek is not attaining water quality standards for arsenic. Arsenic, copper, and zinc TMDLs were approved in 2004 and identified three tailings piles from the former Hillside Mine and a seep (spring) from a collapsed adit as the main contributing sources. A TMDL Implementation Plan was adopted in 2005 and identified encapsulation, grading, and capping of the tailings piles as the primary strategies to reduce loading. A Water Quality Improvement Grant will be used to implement these actions. Water quality impairments related to beryllium, manganese and low pH will be addressed by the TMDL implementation plan.

- EPA listed mercury contamination as an impairment for Alamo Lake during previous listing cycles. ADEQ is currently proposing to list one reach of the Santa Maria River for mercury. Fish consumption advisories have been issued at Alamo Lake and Coors Lake, which caution the public to limit the amount of fish they consume. Mercury may also pose a threat to bald eagles (a federally listed Threatened species) living near the lake, as they also eat the fish. Sampling and modeling for the Alamo Lake mercury TMDL to address to loadings from these tributaries has been completed, however approval of the final TMDL has been deferred in anticipation of a fish tissue water quality standard for methylmercury. Primary sources of the mercury appear to be atmospheric deposition and sediment transport during storm events.

- Alamo Lake and a segment of the Bill Williams below Alamo Lake are also impaired by ammonia and high pH. Ammonia and pH exceedances may be related to nutrient loadings. More monitoring is needed to determine if this is occurring at Alamo Lake and sources of nutrient loadings. A nutrient TMDL is scheduled to be initiated in 2010.

Water Quality Improvement Grant Projects – ADEQ awarded the following Water Quality Improvement Grants (319 Grants) in this watershed. More information concerning these grants or projects can be obtained at: http://www.azdeq.gov/environ/water/watershed/fin.html.

- **Cane Springs Ranch Catchment Restoration Project** -- Cane Springs Ranch (2000)
  Repair and clean sediment catchments, to lessen sediment loading from Cane Springs Ranch to the Big Sandy River.

- **The Greater Kingman Wildcat Dump Cleanup Project** – NW AZ Watershed Council (2000)
  Clean up of 18 wildcat waste dump sites in the Kingman area; to reduce potential ground water contamination. Provide education and outreach to minimize further dumping.

Water Protection Fund Projects – The following Water Protection Fund Projects were awarded by the Arizona Department of Water Resources. More information about these funds or projects can be obtained from the ADWR web site at: http//www.azwater. gov.

- **Big Sandy River Riparian Project** – U.S. Bureau of Land Management (2000)
  Restore riparian condition along an 8-mile perennial reach of the Big Sandy River to reduce sediment transport. This included pasture fencing and development of alternative water sources for livestock.

- **Kirkland Creek Watershed Resource Assessment Project** – Triangle Natural Resources Conservation District (2000)
  Complete a resource assessment of Kirkland Creek and prepare a long-term action plan and implementation schedule for watershed enhancement activities.

Other Water Quality Studies – The following additional water quality related studies were completed since 2000 in this watershed.

- ***Bill Williams Watershed Plan and Characterization (2005)*** – Nonpoint Education for Municipal Officials (NEMO) Program, which is affiliated with the University of Arizona, in cooperation with ADEQ (2005)
  A watershed protection and remediation plan that identifies and quantitatively ranks subwatersheds that are most susceptible to water quality contaminants, specifically: metals, sediment, nutrients, and selenium. The plan also identifies management measures that should be implemented to improve water quality in high risk subwatersheds.

- ***Hydrologic Conditions in the Bill Williams River National Wildlife Refuge and Planet Valley, Arizona, 2000*** – Richard P. Wilson and Sandra J. Owen-Joyce, U.S. Geological Survey in cooperation with the U.S. Fish and Wildlife Service and the Bureau of Reclamation (2002)
  This was an investigation of the current hydrologic conditions along the Bill Williams River, and a delineation of the water table. It included an inventory of wells within the river aquifer of the Colorado River and in Planet Valley.

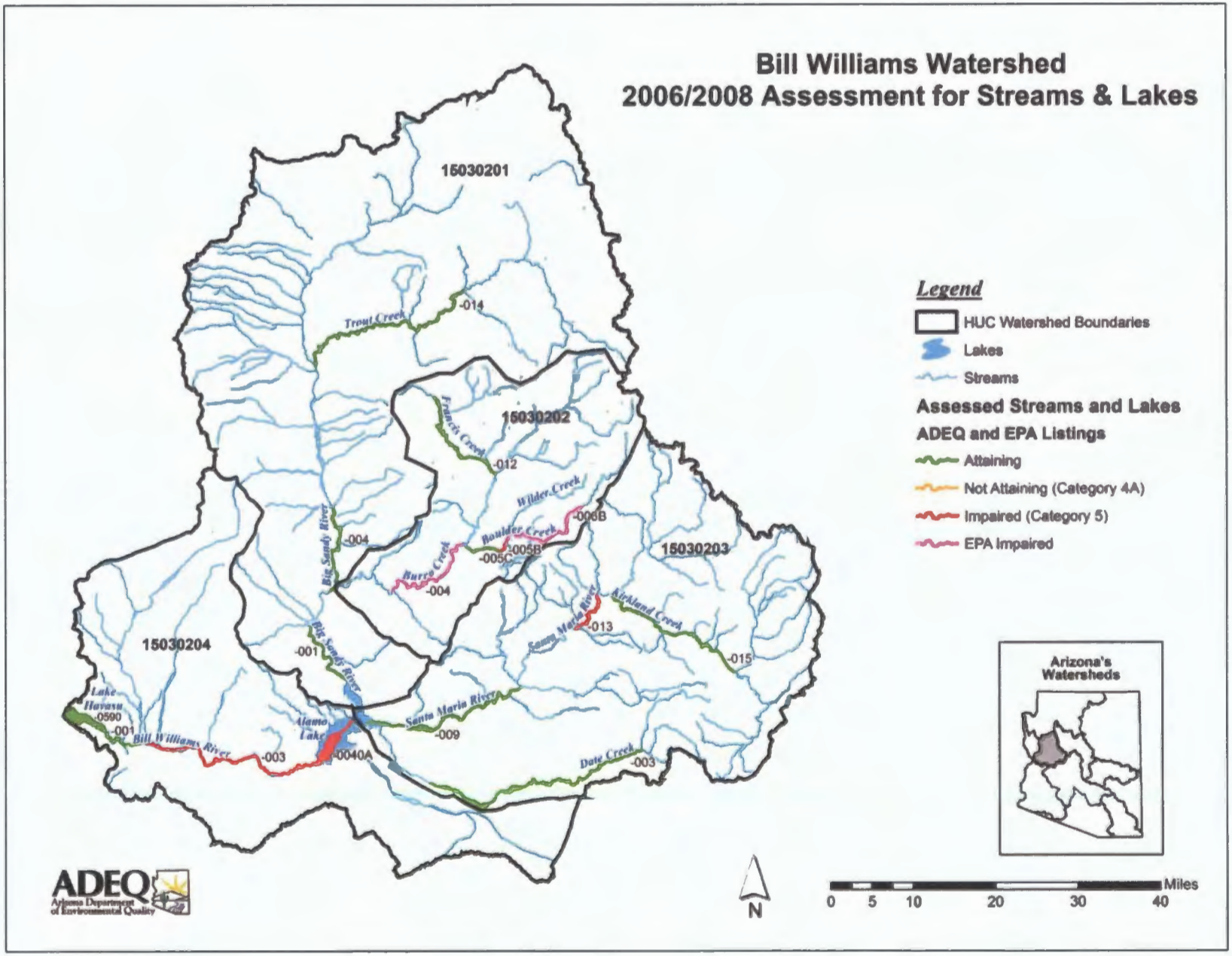
- ***Structural Controls on Ground Water Conditions and Estimated Aquifer Properties near Bill Williams Mountain, Williams, Arizona*** – Herbert A. Pierce, U.S. Geological Survey in cooperation with the City of Williams (2001)
  This is a description of the hydro-geologic units and ground water conditions in the regional aquifer near Williams, Arizona. It identifies regional geologic structural features that in part control ground water conditions, and presents estimated properties of the regional aquifer.

Assessments

The Bill Williams Watershed can be separated into the following drainage areas in Arizona:

15030201	Big Sandy River
15030202	Burro Creek
15030203	Santa Maria River
15030204	Bill Williams River

These drainage areas and the surface waters assessed as "attaining" or "impaired" are illustrated on the following watershed map. Methods used to complete these assessments are described in the "Surface Water Assessment Methods and Technical Support" document (2006/2008).


Bill Williams Watershed
2006/2008 Assessment for Streams & Lakes
15030201
15030202
15030203
15030204
Trout Creek
-014
Francis Creek
-012
Wilder Creek
Boulder Creek
-006B
-005B
-005C
Burro Creek
-004
Big Sandy River
-004
-001
Santa Maria River
-013
Kirkland Creek
-015
Santa Maria River
-009
Alamo Lake
-0040A
Bill Williams River
-003
Lake Havasu
-0590
-001
Date Creek
-003
Legend
HUC Watershed Boundaries
Lakes
Streams
Assessed Streams and Lakes
ADEQ and EPA Listings
Attaining
Not Attaining (Category 4A)
Impaired (Category 5)
EPA Impaired
Arizona's Watersheds
ADEQ
Arizona Department of Environmental Quality
N
0 5 10 20 30 40
Miles

ALAMO LAKE 15030204 – 0040A 14,150 Acres	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Ww – Impaired FBC – Impaired FC – Inconclusive AgL – Impaired	Category 5 Impaired	High pH, ammonia, and low dissolved oxygen	Add low dissolved oxygen to the 303(d) list. High pH listed in 1996. Ammonia listed in 2004.
	EPA	A&Ww – Impaired FC – Impaired	Category 5 Impaired	Mercury in fish tissue.	EPA listed mercury in 2002. Mercury TMDL is awaiting final EPA approval .

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/10/2000 – 9/28/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam BWALA – A USFWS AL-1 101351	ADEQ and USFWS/CoE Ambient ADEQ TMDL	14-67 total and 8-15 dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, nickel, selenium, silver, thallium, and zinc 208 total and 21 dissolved: Mercury	122-173 samples: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen, dissolved oxygen, and pH	1 *E. coli* bacteria 14 Fluorine 40 Total dissolved solids 6 Suspended sediment concentration 6 Turbidity
Mid lake BWALA - B USFWS AL-2 101351	ADEQ and USFWS/CoE Ambient ADEQ TMDL			
Mid lake – North end BWALA – C USFWS AL-3 102514	ADEQ and USFWS/CoE Ambient ADEQ TMDL			
Above Alamo Lake, near Brown's crossing BWBWR045.08 102307	ADEQ TMDL			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Ammonia	0.25 mg/L at pH 10.0 and temp 25.6 C 0.21 mg/L at pH 10.1 and temp 26.8 C A&Ww chronic	06/12/2000 – 0.6 mg/L 09/18/2000 – 0.3 mg/L	Remains impaired – 2 exceedances during the assessment period.
Dissolved oxygen	6.0 mg/L (top meter) A&Ww	11/13/2000 – 5.5 mg/L 12/03/2001 – 3.3 mg/L 04/08/2002 – 1.5 mg/L 05/07/2002 – 1.8 mg/L 12/09/2002 – 4.4 mg/L 11/01/2003 – 1.9 mg/L 09/20/2004 – 4.0 mg/L 09/28/2004 – 4.9 mg/L 11/23/2004 – 5.5 mg/L	Impaired – Low dissolved oxygen in 9 of 60 sampling events (93 of 173 samples – binomial). (When multiple sites were sampled, the lowest DO is shown for that date.) (Binomial)

Mercury (dissolved)	0.01 µg/L A&Ww Chronic	09/28/2004 – 0.016 µg/L	Inconclusive – Only 1 exceedance in during the assessment period. (EPA listing of mercury is based on fish consumption advisory and not chemistry. See mercury discussion below.)
pH (high)	<9.0 SU A&Ww, FBC, AgL	01/10/2000 – 9.7 SU 04/17/2000 – 9.8 SU 06/12/2000 – 10.0 SU 09/08/2000 – 10.2 SU 04/09/2001 – 10.0 SU 06/17/2002 – 10.0SU 07/07/2002 – 10.3 SU 05/19/2003 – 10.1 SU 06/09/2003 – 10.2 SU 01/12/2004 – 9.7 SU	Remains impaired – High pH values in 10 of 60 sampling events (42 of 173 samples) (binomial).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Mercury	Insufficient *E. coli* bacteria to assess FBC		Lab detection limit for dissolved mercury was higher than chronic criterion.

DISCUSSION OF MERCURY IMPAIRMENT	Evidence of potential mercury impairment: 1. The mercury fish consumption advisory issued in 2004 is still in effect; 2. Potential sources of mercury in the watershed; 3. Several tributaries in the watershed have exceedances of mercury standards; 4. Santa Maria River (a tributary to Alamo Lake) is proposed impaired due to mercury; and 5. The mercury TMDL for Alamo Lake should be completed in 2009. ADEQ cannot list Alamo Lake as impaired based on narrative toxic standards due to statutory constraints described in the Assessment Methods document.
MONITORING RECOMMENDATIONS	High Priority – Collect dissolved oxygen, pH, and ammonia samples to support TMDL development. Low dissolved oxygen, high pH, and elevated ammonia may be symptoms of excess nutrient loadings. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Complete development of the mercury TMDL. Use a lower lab detection limit for dissolved mercury. Collect core parameters to represent at least 3 seasons during an assessment period.

BIG SANDY RIVER From Sycamore Wash to Burro Creek 15030201 -- 004 13.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 02/15/2000 – 05/17/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Highway 93 bridge BWBSR034.68 100400	ADEQ Ambient	8-23 total and 5-23 dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc 31 total and 20 dissolved: Mercury 28 total metals only: Boron and manganese	22-28 samples: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen, dissolved oxygen, and pH	21 *E. coli* bacteria 23 Fluoride 22 Total dissolved solids 15 Suspended sediment concentration 25 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Copper (dissolved)	21.6 µg/L at 280 mg/L hardness A&Ww chronic	05/07/2001 – 26 µg/L	Inconclusive – Only 1 exceedance during the assessment period.
Dissolved oxygen	6.0 mg/L A&Ww	05/07/2001 – 4.9 mg/L 07/31/2003 – 5.0 mg/L 09/16/2003 – 5.3 mg/L 09/19/2004 – 5.5 mg/L# 09/28/2004 – 5.5 mg/L	Inconclusive – 4 out of 5 samples taken during low flow and lacked riffle morphology. #Low DO on 09/19/2004 was during storm flow (30,000 cfs as compared to normal of 1-6 cfs); therefore, only 4 of 26 samples did not meet the criterion. (Binomial)
E. coli bacteria	235 CFU/100 ml FBC	02/23/2005 – 620 CFU/100 ml	Inconclusive – Only 1 exceedance. Note that the exceedance occurred during flood flow – 1978 cfs, while normal is 1-6 cfs.
Lead	15 µg/L FBC	02/23/2005 – 27 µg/L	Attaining – Only 1 exceedance in 22 samples (Binomial)
Mercury	0.6 µg/L FC	10/04/2002 – 0.86 µg/L 1/23/2003 – 0.92 µg/L* 09/19/2004 – 2.7 µg/L	Inconclusive – Only 2 exceedances in 13 samples (Binomial) *Samples starting in 2003 superseded prior samples because more reliable methods were used to collect and analyze the data.
Suspended sediment concentration	Geometric mean 80 mg/L A&Ww	02/23/2004 – 227 mg/L 10/21/2004 – 9900 mg/L 12/29/2004 – 1735 mg/L 01/05/2005 – 1680 mg/L 02/23/2005 – 2360 mg/L	Inconclusive – 4 of the 5 samples that exceeded 80 mg/L occurred during high flows so could not be used in the geometric mean calculation. 227 mg/L was occurring during normal flow. Geometric mean standard was not exceeded. (Note that exceedances occurred during 4 of 5 consecutive months monitored.)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	**MISSING CORE PARAMETERS**	**MISSING SEASONAL DISTRIBUTION**	**DETECTION LIMITS NOT LOW ENOUGH**
E. coli bacteria, mercury, and suspended sediment.	Collected all core parameters		Lab detection limits for selenium and most of the dissolved mercury samples were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority –Collect *E. coli* bacteria, mercury, and suspended sediment concentration samples due to exceedances. Use a lower lab detection limit for selenium and dissolved mercury The high suspended sediment concentration indicates heavy sediment transport. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted.	

BIG SANDY RIVER From Rupley Wash to Alamo Lake 15030201 -- 001 10.2 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Attaining FC – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 10/02/2002 – 01/27/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Wikieup, AZ BWBSR015.60 100457	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, zinc 4 total metals only: Boron, lead, manganese 6 total and 3 dissolved: Mercury	4-5 samples: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen, dissolved oxygen, and pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 5 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	10/02/2002 – 5.2 mg/L 12/04/2002 – 5.4 mg/L	Attaining – Low dissolved oxygen due to low flow and ground water upwelling.
Mercury (dissolved)	0.01 µg/L A&Ww chronic	02/24/2005 – 0.013 µg/L	Inconclusive – Criterion exceeded once during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Mercury	Collected all core parameters		Lab detection limits for selenium and half of the dissolved mercury samples were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority –Monitor for mercury due to the exceedances. Use lower lab detection limits for selenium and dissolved mercury.	

BILL WILLIAMS RIVER From Alamo Lake to Castaneda Wash 15030204 -- 003 35.9 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired FBC – Impaired FC – Attaining AgL – Impaired	Category 5 Impaired	Ammonia, low dissolved oxygen, and high pH	Add ammonia, low dissolved oxygen, and high pH to the 303(d) List.

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/01/2000 – 11/20/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Alamo Lake Dam BWBWR038.52 102316	USFWS Ambient and ADEQ TMDL	4-16 total metals only: Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, manganese, mercury, nickel, selenium, silver, thallium, and zinc 1 total and 1 dissolved: Lead	36-56 samples: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, dissolved oxygen, and pH	5 Suspended sediment concentration 5 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Ammonia	0.39 mg/L at pH 9.4 and temp 18.6 C 0.46 mg/L at pH 9.2 and temp 15.5 C 0.39 mg/L at pH 9.3 and temp 17.9 C 0.49 mg/L at pH 8.8 and temp 18.5 C 0.43 mg/L at pH 9.0 and temp 16.3 C 0.47 mg/L at pH 9.0 and temp 15.7 C 0.53 mg/L at pH 9.0 and temp 15.7 C 0.31 mg/L at pH 9.0 and temp 21.8 C A&Ww chronic	06/12/2000 – 0.6 mg/L 10/15/2001 – 0.5 mg/L 07/21/2003 – 0.4 mg/L 08/18/2003 – 0.6 mg/L 09/08/2003 – 0.8 mg/L 06/07/2004 – 0.7 mg/L 07/07/2004 – 0.7 mg/L 09/20/2004 – 0.7 mg/L	Impaired –8 exceedances during the assessment period.
Dissolved oxygen	6.0 mg/L A&Ww	04/08/2002 – 2.7 mg/L 05/07/2002 – 1.7 mg/L 10/27/2002 – 3.6 mg/L 08/18/2003 – 4.8 mg/L 09/08/2003 – 5.0 mg/L 10/06/2003 – 5.5 mg/L 11/01/2003 – 4.0 mg/L 12/15/2003 – 5.0 mg/L 08/09/2004 – 4.7 mg/L 09/20/2004 – 0.7 mg/L	Impaired – Low dissolved oxygen in 10 of 55 samples (binomial).
Lead	15 mg/L FBC	10/27/2004 – 19.0 mg/L	Inconclusive – Only 1 exceedance in 2 sampling events
pH (high)	<9.0 SU A&Ww, FBC, AgL	04/17/2000 – 10.0 SU 06/12/2000 – 10.4 SU 09/18/2000 – 10.2 SU 04/09/2001 – 10.0 SU 05/07/2001 – 10.3 SU 10/15/2001 – 9.2 SU 06/17/2002 – 10.4 SU 07/07/2002 – 10.6 SU 07/21/2003 – 9.3 SU 01/12/2004 – 10.0 SU	Impaired – High pH values in 11 of 56 samples (binomial).

Suspended sediment concentration	Geometric mean 80 mg/L A&Ww	10/27/2004 – 448 mg/L 11/24/2004 – 193 mg/L	Inconclusive – Exceeded standards during both sampling events (3 of 5 samples). Insufficient samples to calculate the geometric mean (need a minimum of 4 samples).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	**MISSING CORE PARAMETERS**	**MISSING SEASONAL DISTRIBUTION**	**DETECTION LIMITS NOT LOW ENOUGH**
Suspended sediment and lead	Insufficient *E. coli* bacteria, dissolved metals (cadmium, copper, zinc) to assess FBC and A&Ww		
MONITORING RECOMMENDATIONS		High Priority – Collect dissolved oxygen, pH, and ammonia samples to support TMDL development. Coordinate TMDL developed for this reach with Alamo Lake, as all exceedances occurred just below the dam outlet from Alamo Lake. Collect suspended sediment concentration and lead samples due to exceedances. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted.	

BILL WILLIAMS RIVER From point B to Colorado River 15030204 -- 001 17.5 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/25/2000 – 05/26/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Mineral Wash near Planet BWBWR009.92 100924	USGS Ambient	3 total and 3-13 dissolved metals: Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, and zinc 2 total and 13 dissolved: Barium, chromium, nickel, and silver 3 total only: Mercury	3-13 samples: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, dissolved oxygen, and pH	8 *E. coli* bacteria 12 Fluorine 6 Suspended sediment concentration 4 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	05/15/2002 – 5.3 mg/L 08/26/2003 – 2.2 mg/L	Attaining – Low dissolved oxygen due to natural conditions of low flow and ground water recharge.
Suspended sediment concentration	Geometric mean 80 mg/L A&Ww	01/30/2003 – 95 mg/L 05/28/2003 – 83 mg/L 05/26/2004 – 121 mg/L	Attaining – Although 3 samples exceeded the 80 mg/L criterion, a rolling geometric mean of 4 consecutive samples did not exceed the standard.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		
MONITORING RECOMMENDATIONS		Low Priority – Since the 80 mg/L criterion for suspended sediment was exceeded during low flows, recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted.	

BOULDER CREEK From unnamed tributary at 344114 / 1131800 to Wilder Creek 15030202 – 006B 14.4 Miles	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Ww – Inconclusive FBC – Inconclusive FC – Attaining AgL – Attaining	Category 2 Attaining Some Uses		
	EPA	A&Ww – Impaired	Category 5 Impaired	Mercury	EPA listed mercury in 2004. (See mercury discussion below)

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 02/10/2000 – 08/04/2005 4-day mercury samples: 06/20- 06/23/2005; 08/01-08/04/2005; 10/24-10/27/2005; 2/6-2/9/2006; 5/1-5/4/2006 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Wild Horse Basin BWBOU017.35 102022	ADEQ TMDL	16 total and 36 dissolved: Mercury (grab samples) Five 4-day mercury sampling events 9-23 total and 9-14dissolved metals: Arsenic, beryllium, chromium, copper, lead, manganese, and zinc 14 total metals only: Cadmium, selenium, silver	7 Dissolved oxygen and 50 pH	3 Suspended sediment concentration 2 Turbidity
Below Warm Spring Creek Tungstona 1 BWBOU013.05 102019	Phelps Dodge Ambient			
Below Tungstona Mine Tungstona 2 BWBOU012.82 102233	Phelps Dodge Ambient			
Uppermost project site Site N BWBOU009.00 101015	ADEQ TMDL			
Above Hillside Mine Hillside 2 BWBOU008.92 100401	Phelps Dodge Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Beryllium	65 µg/L A&Ww acute	08/16/2001 – 94 µg/L	Inconclusive – 1 exceedance in the last 3 year of monitoring.
Mercury	0.6 µg/L FC	09/10/2002 – 3.4 µg/L	Attaining – 1 exceedance in 8 sampling events. (Binomial)
Mercury (dissolved)	0.01 µg/L A&Ww chronic	08/23/2000 – 0.3 µg/L 03/05/2002 – 0.3 µg/L 04/18/2002 – 0.2 µg/L 09/10/2002 – 2.7 µg/L** 11/20/2002 – 0.2 µg/L 02/23/2004 – 0.018 µg/L*	Inconclusive –Only 1 exceedance is counted. *Samples starting in 2003 superseded prior samples because more reliable methods were used to collect and analyze the data. **2.7 is the mean of three mercury samples collected on 09/10/2002 (1.8, 2.9, and 3.4) µg/L). See mercury discussion below.

Suspended sediment concentration (SSC)	Geometric mean 80 mg/L A&Ww	09/19/2004 – 4554 mg/L 10/22/2004 – 432 mg/L	Inconclusive – Both exceedances occurred during high flows, so could not be used for geometric mean calculation. Insufficient samples left to apply the standard.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Beryllium, mercury, and suspended sediment concentration	Insufficient *E. coli* bacteria to assess FBC		Lab detection limits for dissolved copper and lead were above A&W chronic criteria in at least 6 samples.

MERCURY IMPAIRMENT DISCUSSION	Ultra clean field techniques were used for mercury samples collected in 2003-2006 by ADEQ and Phelps Dodge. These techniques allow laboratories to accurately report results as low as 0.00025 µg/L. This newer and more reliable data was therefore given a higher weight in the assessment, and in this case superseded previously collected data. Five sets of 4-day mercury samples collected by Phelps Dodge were considered in this assessment although several sets were collected after the assessment period (newer data). No exceedances occurred in these datasets. The exceedance on 02/23/2004 (0.018 µg/L) occurred at Wild Horse Basin and an old mining operation exists in this area. Samples collected during storm flows did not represent chronic conditions, so were not compared to chronic criteria for this assessment. Evidence of potential mercury impairment: 1. Several mercury detections in this reach. Mercury readily adheres to sediment and tissue, and therefore, the detection of it in the water column is unlikely and therefore significant. 2. Mercury fish consumption advisory downstream at Alamo Lake; 3. One exceedance of the total mercury standard for fish consumption; and 4. Historic mining sources in the reach. Although there is evidence of impairment, only one exceedance using the more reliable field and laboratory methods is insufficient for Arizona to list the reach as impaired. Note that the Alamo Lake mercury TMDL should be completed in 2009 and may provide loadings to the Burro Creek drainage area (that includes Boulder Creek).
MONITORING RECOMMENDATIONS	Medium Priority – Collect mercury, beryllium, and suspended sediment concentration samples due to the exceedances. Collect core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for dissolved copper and lead.

BOULDER CREEK From Wilder Creek to Butte Creek 15030202 – 005A 1.4 Miles (Since last assessment, split reach 005A into 005A&B, and changed 005B to 005C)	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired FBC – Impaired FC – Inconclusive AgI – Impaired AgL – Impaired	Category 4A (arsenic, copper, zinc) Category 4B (beryllium, low pH, manganese) Not Attaining	Beryllium, low pH, manganese, arsenic, copper, and zinc	Add beryllium, manganese, and low pH to 4B. TMDLs for arsenic, copper, and zinc were completed in 2004.
	A&Ww – Impaired (Affected use only)	Category 5 Mercury	Mercury	EPA listed mercury in 2004.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 02/10/2000 – 08/04/2005 4-day mercury samples: 11/29-12/02/2004; 06/20-06/23/2005; 08/01-08/04/2005; 10/24-10/27/2005; 2/6-2/9/2006; 5/1-5/4/2006 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Wilder Creek – Site L BWBOU008.62 101013	ADEQ TMDL	17 total and 29 dissolved: Mercury (grab samples) Six sets of 4-day mercury samples 50-66 total and dissolved metals: Arsenic, beryllium, copper, lead, manganese, and zinc 17 total and 4-22 dissolved: Cadmium 13-16 total and 2-3 dissolved: Selenium, silver 2 total and 3 dissolved: Antimony, barium, boron, nickel	57 Dissolved oxygen and 107 pH	2 Fluoride 10 Suspended sediment concentration 4 Turbidity
Hillside Mine upper tailings BWBOU008.53 102232	ADEQ TMDL			
NW edge upper tailings BWBOU008.49 102231	ADEQ TMDL			
Above Hillside Mine BWBOU008.42 102023	ADEQ TMDL			
Upstream of tailings Site JJ BWBOU008.28 101439	ADEQ TMDL			
Above Hillside middle tailings BWBOU007.98 102226	ADEQ TMDL			
Amid tailings (mid + up) Site J BWBOU007.92 101012	ADEQ TMDL			
At Hillside adit BWBOU007.83 102024	ADEQ TMDL			
Amid tailings (mid + low)Site-H BWBOU007.76 101011	ADEQ TMDL			
Below middle tailings piles BWBOU007.59 102227	ADEQ TMDL			
Between mid and lower tailings BWBOU007.55 102228	ADEQ TMDL			
Above lower tailings pile BWBOU007.49 102229	ADEQ TMDL			
Near lower tailings pile BWBOU007.43 102230	ADEQ TMDL			

Below tailings piles - Site G BWBOU007.13 101010	ADEQ TMDL			
Above Butte Creek Hillside 1 BWBOU006.57 102223	Phelps Dodge Ambient			

EXCEEDANCES			
POLLUTANT	**STANDARD UNIT DESIGNATED USES**	**DATES EXCEEDANCES**	**DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS**
Arsenic	50 µg/L – FBC 200 µg/L – AgL 1450 µg/L – FC 2000 µg/L – AgI	Too many exceedances to list here.	Remains impaired – Exceedances occurred during all 23 sampling events (Binomial) Maximum concentration was 11,400 µg/L. Highest values were at site 102024. Exceedances occurred at several other sites.
Beryllium	5.3 µg/L A&Ww chronic	10/26/2000 – 63 µg/L 03/27/2001 – 6.0 µg/L 04/25/2001 – 6.0 µg/L 05/22/2001 – 6.0 µg/L 08/15/2001 – 31 µg/L 08/28/2001 – 19 µg/L 11/02/2001 – 5.5 µg/L	Impaired – Exceeded criterion during 7 sampling events during the assessment period. (Exceeded in 10 of 66 samples collected.) See monitoring site discussion below.
Copper	500 µg/L – AgL 1300 µg/L – FBC 5000 µg/L – AgI	10/26/2000 – 36,000 µg/L 08/15/2001 – 36,000 µg/L 08/28/2001 – 115,000 µg/L	Attaining – Exceeded standards in 6 of 73 samples (only 3 monitoring events). (Binomial)
Copper (dissolved)	49.6 µg/L at >400 mg/L hardness 9.8 µg/L at 72 mg/L hardness 49.6 µg/L at >400 mg/L hardness 49.6 µg/L at >400 mg/L hardness 30.7 µg/L at 240 mg/L hardness A&Ww acute	10/26/2000 – 39,000 µg/L 01/30/2001 – 80 µg/L 08/15/2001 – 33,100 µg/L 08/28/2001 – 114,000 µg/L 12/31/2001 – 90 µg/L	Remains impaired – Exceeded calculated standard five times during the assessment period.
Dissolved oxygen	6.0 mg/L A&Ww	Too many to list here. Low dissolved oxygen values in 11 of 15 sampling events.	Attaining – Low dissolved oxygen due to low flow and ground water upwelling.
Lead	15 µg/L FBC	01/30/2001 – 30 µg/L 02/27/2001 – 17 µg/L 08/15/2001 – 24 µg/L	Attaining – 3 of 62 samples exceeded criterion.
Manganese	10,000 µg/L -- AgI 196,000 µg/L – FBC	Too many exceedances to list here.	Impaired – 22 of 74 samples exceeded standards. (14 of 20 sampling events). (Binomial) Highest value was 367,000 µg/L. High concentrations were found at several sites. See monitoring site discussion below.
Mercury	0.6 µg/L – FC 10 µg/L – AgL	09/10/2002 – 3.8 µg/L** 08/23/2003 – 98 µg/L*	Attaining – 1 exceedance in 11 sampling events. (binomial approach) ** Data collected before more reliable sampling techniques. *98 µg/L is the mean value of 3 samples collected below the tailings.
Mercury (dissolved)	0.01 µg/L A&Ww chronic	03/21/2001 – 0.2 µg/L 9/10/2002 – 3.8 µg/L 09/25/2003 – 0.0365 µg/L*	Inconclusive – Only 1 exceedance is counted (09/25/2003). *Samples starting in 2003 superseded prior samples because more reliable methods were used to collect and analyze the data. See mercury discussion below.
pH	<9.0 SU -- A&Ww, FBC, AgL, AgI >6.5 SU – A&Ww, FBC, AgL	08/22/2000 – 9.5 SU 10/26/2000 – 2.6 SU 01/30/2001 – 6.2 SU 03/27/2001 – 5.6 SU 04/25/2001 – 6.0 SU 05/22/2001 – 6.0 SU 06/26/2001 – 5.7 SU 08/15/2001 – 3.7 SU 08/28/2001 – 11.7 SU 08/28/2001 – 2.4 SU 11/02/2001 – 5.9 SU	Impaired – Exceeded criteria in 25 of 87 samples (12 of 30 sampling events). (Binomial) See monitoring site discussion below.

		09/25/2003 – 1.9 SU	
Suspended sediment concentration (SSC)	Geometric mean 80 mg/L	08/23/2003 – 48,627 mg/L 09/19/2004 – 1,443 mg/L 10/21/2004 – 1,747 mg/L	Attaining– All exceedances of the 80 mg/L criterion were during high flow events so could not be included in the geometric mean. Geometric mean was not exceeded.
Zinc	10,000 – AgI 25,000 – AgL 69,000 – FC	10/26/2000 – 160,000 µg/L 08/15/2001 – 184,000 µg/L 08/28/2001 – 692,000 µg/L	Attaining – 8 of 66 samples exceeded (3 of 24 sampling events). (Binomial) However, magnitude of the exceedances should be noted.
Zinc (dissolved)	379 µg/L at >400 mg/L hardness 379 µg/L at >400 mg/L hardness 379 µg/L at >400 mg/L hardness A&Ww acute	Too many to list here	Remains impaired – Exceeded criteria 13 times during the last 3 years of monitoring. Highest concentration was 262,000 µg/L. Exceedances occurred during all 17 sampling events.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Mercury	*E. coli* bacteria		Lab detection limits for dissolved metals (copper, lead) and selenium were higher than chronic criteria in 6-35 samples.

DISCUSSION OF ASSESSMENT CATEGORIES, REMEDIATION EFFORTS, AND USE OF MONITORING DATA FROM POOLS ALONG THIS INTERMITTENT STREAM

Arsenic, copper, and zinc are in Category 4A because TMDLs have been completed for these parameters. Proposed remediation of historic mine tailings along Boulder Creek should mitigate the metal loadings (including mercury loadings) and the low pH; therefore, beryllium, manganese, and low pH are listed Category 4B.

Ultra clean field techniques were used for mercury samples collected in 2003-2006 by ADEQ and Phelps Dodge. These techniques allow laboratories to accurately report results as low as 0.00025 µg/L. This newer and more reliable data was therefore given a higher weight in the assessment, and in this case superseded previously collected data.

Six sets of 4-day mercury samples collected by Phelps Dodge were considered in this assessment although several sets were collected after the assessment period (newer data). No exceedances occurred in these datasets. However, one exceedance occurred near Hillside Mine's upper tailings site on 09/25/2003 (0.0365 µg/L).

Samples collected during storm flows did not represent chronic conditions, so were not compared to chronic criteria for this assessment.

Evidence of potential mercury impairment:

1. Several mercury detections in this reach. Mercury readily adheres to sediment and tissue, and therefore, the detection of it in the water column is unlikely and therefore significant.
2. Mercury fish consumption advisory downstream at Alamo Lake;
3. One exceedance of the total mercury standard for fish consumption; and
4. Historic mining sources in the reach.

Although there is significant evidence of impairment, only one exceedance using the more reliable field and laboratory methods is insufficient for Arizona to list the reach as impaired.

Note that the Alamo Lake mercury TMDL should be completed in 2009 and may provide loadings to the Burro Creek drainage area (that includes Boulder Creek).

MONITORING RECOMMENDATIONS

Medium Priority –Collect mercury samples due to exceedances. Collect arsenic, beryllium, copper, manganese, mercury, zinc, and pH samples during critical conditions and in critical locations, once strategies are implemented to reduce loadings. Collect core parameters to represent at least 3 seasons during an assessment period. Use lower lab reporting limits for selenium and dissolved metals.

BOULDER CREEK From Butte Creek to Copper Creek 15030202 – 005B 1.6 Miles (Since last assessment, split reach 005A into 005A&B, and changed 005B to 005C)	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Inconclusive FBC – Impaired FC – Inconclusive AgL – Attaining	Category 4A Not Attaining	Arsenic	TMDL for arsenic, copper, and zinc completed in 2004.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 02/10/2000 – 08/04/2005 4-day mercury samples: 11/29-12/02/2004 ; 06/20-06/23/2005; 08/01-08/04/2005; 10/24-10/27/2005; 2/6-2/9/2006; 5/1-5/4/2006 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Butte Creek BWBOU006.53 102082	ADEQ TMDL	6 total and 14 dissolved (grab samples): Mercury 3 sets of 4-day mercury samples were collected at Boulder 2 site 6 total and 11-12 dissolved metals: Arsenic, copper, manganese, and zinc 5-6 total only: Beryllium, lead, 1-2 total and dissolved: Cadmium, selenium, silver	5 Dissolved oxygen and 20 pH	
Below Butte Creek – Site E BWBOU006.01 101009	ADEQ TMDL			
Above Copper Creek Boulder 2 BWBOU005.15 102193	Phelps Dodge Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Arsenic	50 µg/L – FBC	11/30/2000 – 58 µg/L 01/04/2001 – 71 µg/L 04/24/2001 – 73 µg/L 03/05/2002 – 53 µg/L	Remains impaired – Exceedances occurred in 4 of 12 sampling events (4 of 16 samples) (Binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient *E. coli* bacteria, dissolved cadmium, and mercury to assess A&Ww, FBC or FC		Lab detection limits for dissolved metals (copper, lead) and selenium were higher than chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority –Collect arsenic samples to determine effectiveness of strategies to reduce loading, once implemented. Collect core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for selenium and dissolved metals. Note: No mercury exceedances.	

BOULDER CREEK From Copper Creek to Burro Creek 15030202 – 005C 5.0 Miles	USE SUPPORT	OVERALL ASSESSMENT	(Since last assessment, split reach 005A into 005A&B, and changed 005B to 005C)
	A&Ww – Inconclusive FBC – Inconclusive FC – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 02/10/2000 – 08/04/2005 4-day mercury samples: 11/29-12/02/2004; 06/20-06/23/2005; 08/01-08/04/2005; 10/24-10/27/2005; 2/6-2/9/2006; 5/1-5/4/2006 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Copper Creek Boulder 1 or Site B BWBOU005.11 101008	Phelps Dodge Ambient and ADEQ TMDL	12 total and 27 dissolved: Mercury (grab samples) Six 4-day mercury samples 9-26 total and dissolved metals: Arsenic, beryllium, chromium, copper, lead, manganese, and zinc 12 total only: Cadmium, selenium	13 Dissolved oxygen and 41 pH	1 Suspended sediment concentration 5 Turbidity
Below Mulholland Wash Boulder 4 BWBOU002.18 102224	Phelps Dodge Ambient			
Above Zana Canyon BWBOU001.51 102225	ADEQ TMDL			
Above Burro Creek – Site A BWBOU000.66 101007	ADEQ Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Arsenic	50 µg/L FBC	01/04/2001 – 52 µg/L 04/24/2001 – 58 µg/L	Attaining – 2 of 17 samples exceeded the criterion (binomial).
Dissolved oxygen	6.0 mg/L A&Ww	05/23/2001 – 3.9 mg/L	Attaining – Low dissolved oxygen due to low flow and ground water upwelling.
Lead	15 µg/L FBC	02/28/2001 – 34 µg/L	Attaining – Only 1 exceedance in 14 samples.
Mercury	0.6 µg/L FC	09/10/2002 – 7.2 µg/L*	Attaining – *No exceedances in 8 sampling events using more reliable sampling techniques. (binomial).
Mercury (dissolved)	0.01 µg/L A&Ww chronic	09/10/2002 – 7.2 µg/L*	Attaining – *No exceedances in 8 sampling events using more reliable sampling techniques.
pH	<9.0 SU A&Ww, FBC, AgL	08/23/2000 – 9.4 SU	Attaining – Only 1 exceedance in 41 samples (binomial)
Selenium	2.0 µg/L A&Ww chronic	03/04/2002 – 3.0 µg/L	Inconclusive– One exceedance during the assessment period. Exceedance in the prior year is only slightly over the standard.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Selenium	Insufficient *E. coli* bacteria to assess FBC.		
MONITORING RECOMMENDATIONS		Medium Priority –Collect additional selenium samples due to the exceedance. Collect core parameters to represent at least 3 seasons during an assessment period.	

BRIDLE CREEK From headwaters to Santa Maria River 15030203 – 027 25.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 09/09/2003 – 01/05/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Highway 97 BWBRI016.91 102310	ADEQ TMDL	6 total metal and 4 dissolved: Mercury	1 Dissolved oxygen, 6 pH	1 Fluoride 5 Suspended sediment concentration 3 Turbidity
Below Mountain Springs BWBRI009.54 102313	ADEQ TMDL			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Mercury	0.6 µg/L FC	09/09/2003 – 0.63 µg/L	Inconclusive – Only 1 exceedance in 6 samples (binomial).
Suspended Sediment Concentration (SSC)	Geometric mean 80 mg/L A&Ww	08/17/2004 – 4440 mg/L 09/19/2004 – 1026 mg/L 10/21/2004 – 530 mg/L 01/06/2005 – 8616 mg/L	Inconclusive – Exceedances occurred during all 4 sampling events; however, samples were collected during higher flows, so could not be included in the Geometric mean calculation. Geometric mean was not exceeded.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Mercury and suspended sediment	Insufficient dissolved metals (cadmium, copper, zinc), *E. coli* bacteria, total copper and total lead to assess A&Ww, FBC, and FC	Insufficient monitoring events	

MONITORING RECOMMENDATIONS	Medium Priority –Collect mercury and suspended sediment samples due to exceedances. Collect core parameters to represent at least 3 seasons during an assessment period. The high SSC values indicate heavy sediment transport. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted.

BURRO CREEK From Francis Creek to Boulder Creek 15030202 – 008 13.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 02/10/2000 – 08/04/2005 4-day mercury samples: 06/20-06/23/2005; 08/01-08/04/2005; 10/24-10/27/2005; 2/6-2/9/2006; 5/1-5/4/2006 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Boulder Creek Burro 3 BWBRO029.91 100404	Phelps Dodge Ambient and ADEQ TMDL	5 total and 15 dissolved metals: Chromium, mercury Five sets of 4-day mercury samples 5-6 total only: Arsenic, cadmium, copper, manganese, selenium, silver, and zinc. 1 total only: Beryllium	1 Dissolved oxygen and 17 pH	1 Suspended sediment concentration 1 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Chromium	100 µg/L FBC	09/09/2002 – 150 µg/L	Inconclusive – 1 of 6 samples exceeded the criterion (binomial).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Chromium	Insufficient dissolved metals (cadmium, copper, zinc), *E. coli* bacteria, boron and lead to assess designated uses		
MONITORING RECOMMENDATIONS		Medium Priority – Collect chromium samples due to the exceedances. Collect core parameters to represent at least 3 seasons during an assessment period. Note: No dissolved mercury exceedances since "clean hands" field and laboratory techniques were applied. This includes the last 3 years of monitoring.	

BURRO CREEK From Boulder Creek to Black Canyon Creek 15030202 – 004 17.2 Miles	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Ww – Attaining FBC – Inconclusive FC – Attaining AgL – Attaining	Category 2 Attaining some uses		
	EPA	A&Ww – Impaired	Category 5 Impaired	Mercury	EPA listed mercury in 2004.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 02/10/2000 – 08/04/2005 4-day mercury samples: 11/29-12/02/2004 ; 06/20-06/23/2005; 08/01-08/04/2005; 10/24-10/27/2005; 2/6-2/9/2006; 5/1-5/4/2006 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Boulder Creek BWBRO029.27 100403	ADEQ Ambient	43 total and 51 dissolved: Mercury (grab samples) Six sets of 4-day mercury samples 13-33 total and dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, lead, and zinc 11-30 total metals only: Boron, manganese, selenium 5-6 total and dissolved metals: Barium, nickel, thallium, silver	19-30 Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, dissolved oxygen 60 pH	18 *E. coli* bacteria 20 Fluoride 20 Total dissolved solids 21 Suspended sediment concentration 26 Turbidity
Below Mammoth Wash Burro 4 BWBRO025.09 102243	Phelps Dodge Permit Ambient			
Above Six-mile Crossing Burro 2 BWBRO023.54 102244	Phelps Dodge Permit Ambient			
Below Six-mile Crossing BWBRO023.18 101365	ADEQ Ambient			
At old Highway 93 bridge BWBRO012.95 102025	ADEQ TMDL			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Mercury	0.6 µg/L FC	11/18/2002 – 0.8 µg/L 09/19/2004 – 1.4 µg/L*	Attaining – *Only 1 exceedance in 18 sampling events (using more reliable monitoring techniques). (Binomial)
Mercury (dissolved)	0.01 µg/L A&Ww chronic	02/10/2000 – 0.2 µg/L** 03/04/2002 – 0.5 µg/L** 11/18/2002 – 0.8 µg/L** 02/10/2003 – 0.2 µg/L**	Attaining – **No exceedances based on newer, more reliable data. Sample results starting in June 2003 superseded prior samples because more reliable methods were used to collect and analyze the samples. (See mercury discussion below.)
Suspended sediment concentration (SSC)	Geometric mean 80 mg/L	09/19/2004 – 3110 mg/L 10/22/2004 – 2385 mg/L 11/23/2004 – 83 mg/L 12/29/2004 – 1067 mg/L	Attaining – Although 4 samples exceeded the 80 mg/L criterion, all occurred during high flow events, so these measurements could not be included in the geometric mean calculation. Remaining samples did not exceed the geometric mean standard.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	E. coli bacteria		

MERCURY DISCUSSION	Ultra clean field techniques were used for mercury samples collected in 2003-2006 by ADEQ and Phelps Dodge. These techniques allow laboratories to accurately report results as low as 0.00025 µg/L. This newer and more reliable data was therefore given a higher weight in the assessment, and in this case superseded previously collected data. Six sets of 4-day mercury samples collected by Phelps Dodge were considered in this assessment although several sets were collected after the assessment period (newer data). No exceedances occurred in these datasets. Evidence of potential mercury impairment: 1. Historic mining sources in tributaries; 2. Mercury fish consumption advisory downstream at Alamo Lake; 3. The one exceedance of the fish consumption standard occurred during a flood flow when dissolved mercury could not be calculated by the laboratory; 4. The Alamo Lake mercury TMDL should be completed in 2007 and may provide sufficient loading analysis; and 5. No exceedances occurred in any of the samples where the more reliable monitoring and analysis techniques were used. Although some evidence of potential impairment exists, no exceedances occurred during the assessment period when more reliable monitoring techniques were used.
MONITORING RECOMMENDATIONS	Low Priority – Collect mercury data to evaluate effectiveness of the mine tailings remediation actions. Collect missing core parameters to represent at least 3 seasons during an assessment period. The high SSC values indicate heavy sediment transport. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted.

BUTTE CREEK From headwaters to Burro Creek 15030202 -- 163 2.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 02/10/2000 – 07/13/2005 4-day mercury samples: 11/29-12/02/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Hillside Mine area tributary BWBUT000.59 103504	Phelps Dodge Ambient	5 total and 5-6 dissolved: Chromium 9 total and 10 dissolved: Mercury (grab samples) Four sets of 4-day mercury samples 4-8 total and 0-1 dissolved metals: Arsenic, beryllium, cadmium copper, lead, manganese, selenium, silver, zinc.	1 sample: Dissolved oxygen 12 pH	3 Turbidity
Above Boulder Creek BWBUT000.02 102081	ADEQ TMDL			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Mercury	0.6 µg/L FC	03/05/2002 – 1.1 µg/L*	Attaining – *No exceedances in 3 sampling events collected using more reliable monitoring and lab techniques.
Mercury (dissolved)	0.01 µg/L A&Ww chronic	03/21/2001 – 0.2 µg/L* 03/05/2002 – 1.1 µg/L*	Attaining – *No exceedances in 3 sampling events. Newer, more reliable monitoring and lab analysis data supersedes the previously collected data.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Mercury	Insufficient dissolved metals (cadmium, copper, and zinc), and *E. coli* bacteria to assess A&Ww and FBC.		
MONITORING RECOMMENDATIONS		Low Priority -- Collect core parameters to represent at least 3 seasons during an assessment period.	

COORS LAKE 15030202 -- 5000 230 Acres	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive		
	EPA	FC – Impaired	Category 5 Impaired	Mercury	EPA assessed as impaired in 2004 due to mercury in fish tissue

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 02/10/2000 – 07/13/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid lake BWCOO - B 102756	AGFD Ambient	1 total metal only: Cadmium, lead, nickel, and zinc.	1 sample: Dissolved oxygen, pH, ammonia, nitrite/nitrate, nitrogen, total Kjeldahl nitrogen, and phosphate	1 Fluoride

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances in water chemistry			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient monitoring events	Lab detection limit for total mercury was higher than FC criterion.
MERCURY IMPAIRMENT DISCUSSION		Evidence of potential mercury impairment: • A fish consumption advisory issued in 2004 is still in effect.	
MONITORING RECOMMENDATIONS		High Priority –Collect mercury samples to support development of a TMDL. Collect core parameters to represent at least 3 seasons during an assessment period. Use a lower lab detection limit for mercury.	

COPPER BASIN WASH From headwaters to unnamed tributary at 342811 / 1123531 15030203 – 032A 4.6 Miles	USE SUPPORT	OVERALL ASSESSMENT
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgL – Inconclusive	Category 3 Inconclusive

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 03/03/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Upper Copper Basin Wash BWCBW009.23 102323	ADEQ TDML	1 total and 1 dissolved: Mercury 1 total metals only: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, nickel, selenium, silver, and zinc	None	None

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Copper	500 µg/L – AgL 1300 µg/L – FBC	03/03/2004 – 1720 µg/L	Inconclusive – Only 1 exceedance (binomial)
Lead	15 µg/L FBC	03/03/2004 – 20 µg/L	Inconclusive – Only 1 exceedance (binomial)
Selenium	2.0 µg/L A&Wc chronic	03/03/2004 – 5.0 µg/L	Inconclusive – Only 1 exceedance in the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Copper, lead and selenium	Insufficient core parameters	Insufficient sampling events.	
MONITORING RECOMMENDATIONS		Medium Priority –Collect copper, lead, and selenium samples due to exceedances. Collect core parameters to represent at least 3 seasons during an assessment period. (Note that A&W chronic criteria for mercury do not apply to this ephemeral wash.)	

DATE CREEK	USE SUPPORT	OVERALL ASSESSMENT	
From Cottonwood Creek to unnamed reach (15030203-008) 15030203 -- 003 34.1 Miles	A&Ww – Attaining FBC – Attaining FC – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 10/22/2002 – 05/26/04 NUMBER AND TYPES OF SAMPLES Metals	Nutrients – Related	Other
Above Date Creek Ranch BWDAT038.02 100529	ADEQ Ambient and TMDL	4-5 total and dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, zinc 4 total and 0 dissolved: Boron, lead, manganese 6 total and 2 dissolved: mercury 1 total and 0-1 dissolved: Barium, nickel, selenium, silver	4-5 samples: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen, dissolved oxygen, and pH	3 *E. coli* bacteria 5 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 5 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and 1 of 2 dissolved mercury samples were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Use lower lab detection limits for selenium and dissolved mercury.	

FRANCIS CREEK	USE SUPPORT	OVERALL ASSESSMENT	
From headwaters to Burro Creek 15030202 -- 012 23.8 Miles	A&Ww – Attaining FBC – Attaining FC – Attaining DWS – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 10/21/2002 – 09/24/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Spencer Creek BWFRA002.33 100556	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, zinc 4 total metals only: Boron, lead, manganese 6 total and 1 dissolved: mercury	4-5 samples: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen, dissolved oxygen, and pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 5 Suspended sediment concentration 5 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and 1 of 2 dissolved mercury samples were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Use lower lab detection limits for selenium and dissolved mercury.	

KIRKLAND CREEK From Skull Valley to Santa Maria River 15030203 -- 015 22.6 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Inconclusive FC – Attaining AgI – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 10/23/2002 – 06/25/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Ritter's Ranch BWKRK017.08 100408	ADEQ Ambient and TMDL	6 total and 2 dissolved: Mercury 4 total and dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, zinc 4 total metals only: Boron, lead, and manganese	4 samples: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen, dissolved oxygen, and pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 5 Suspended sediment concentration 4 Turbidity
At Yava Bridge BWKRK009.32 102320	ADEQ TMDL			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
E. coli bacteria	235 CFU/100 ml FBC	10/23/2002 – 436 CFU/100 ml	Inconclusive – 1 exceedance during the last 3 years of monitoring.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
E. coli bacteria	Collected all core parameters		Lab detection limits for selenium and 1 of 2 dissolved mercury samples were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority – Collect E. coli bacteria samples due to the exceedance. Use lower lab detection limits for selenium and dissolved mercury.	

KNIGHT CREEK From Wheeler Wash to Big Sandy River 15030201 -- 019 9.9 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING Dates: 09/19/2004; 10/21/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Big Sandy River BWKNI000.53 102311	ADEQ TMDL	2 total only: Mercury	1 sample: Dissolved oxygen and pH	2 Suspended sediment concentration

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Mercury	0.6 µg/L FC	09/19/2004 – 1.94 µg/L 10/21/2004 – 0.96 µg/L	Inconclusive – Both samples collected exceeded standards. (Requires a minimum of 5 exceedances and 20 samples to determine impairment - Binomial)
Suspended sediment concentration	Geometric mean 80 mg/L A&Ww	09/19/2004 – 35,160 mg/L 10/21/2004 – 48,700 mg/L	Inconclusive – Both samples exceeded standards. Flow was measured for only one sample and it was 3.2 cfs. Field notes indicate the other was during high flow conditions of 9-10 cfs, so could not be used in the geometric mean calculation. Insufficient samples to calculate the geometric mean (requires a minimum of 4 samples.)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Mercury and suspended sediment	Insufficient core parameters	Insufficient monitoring events	
MONITORING RECOMMENDATIONS		Medium Priority –Collect mercury and suspended sediment concentration samples due to exceedances. These mercury samples were collected to support the development of TMDL for Alamo Lake (downstream). These relatively high levels in mercury indicate mercury loading may be coming from this drainage. Collect core parameters to represent at least 3 seasons during an assessment period. The high SSC values indicate heavy sediment transport. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted.	

SANTA MARIA RIVER From Little Sycamore Creek to Little Shipp Wash 15030203 -- 013 6.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired FBC – Inconclusive FC – Attaining AgI – Inconclusive AgL – Inconclusive	Category 5 Impaired	Mercury	Add to the 303(d) List (new 2006).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 07/31/2003 – 01/05/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Highway 96 BWSMR042.16 102318	ADEQ TDML	1 total metals only: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, and zinc 5 total and 3 dissolved: Mercury	2 Dissolved oxygen 6 pH	6 Suspended sediment concentration 4 Turbidity
Below Highway 96 BWSMR041.23 102319	ADEQ TMDL			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	07/31/2003 – 5.0 mg/L	Attaining – Low dissolved oxygen due to natural conditions of low flow and ground water upwelling.
Mercury (dissolved)	0.01 µg/L A&Ww chronic	07/31/2003 – 0.017 µg/L 08/18/2004 – 0.022 µg/L	Impaired – 2 exceedances during the assessment period. Impairment decision supported by downstream impairment on Santa Maria River and at Alamo Lake, and ultra-clean field sampling techniques.
Suspended sediment concentration	Geometric mean 80 mg/L A&Ww	07/31/2003 – 209 mg/L 08/18/2004 – 1042 mg/L 09/19/2004 – 5084 mg/L 10/21/2004 – 480 mg/L 12/29/2004 – 8850 mg/L 01/05/2005 – 365 mg/L	Inconclusive – Exceeded 80 mg/L criterion in all 6 samples collected. High flow conditions were occurring during 4 of the sampling events (5084, 480, 8850, and 365 mg/L), so these values could not be included in the geometric mean calculation. Insufficient values were left to calculate a geometric mean, as a minimum of 4 samples are required.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Suspended sediment	Insufficient dissolved metals (cadmium, copper, zinc), *E. coli* bacteria, boron, manganese, copper, and lead needed to assess A&Ww, FBC, AgI, and AgL		

MONITORING RECOMMENDATIONS	High Priority – Collect mercury samples to support TMDL development to evaluate effectiveness of TMDL implementation plans and remediation actions for Alamo Lake. Collect suspended sediment concentration samples due to exceedances. The high SSC values indicate heavy sediment transport. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Collect core parameters to represent at least 3 seasons during an assessment period.

SANTA MARIA RIVER From Bridle Creek to Date Creek 15030203 -- 009 24.5 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Inconclusive FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 2 Attaining some uses		

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 02/14/2000 – 05/17/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Highway 93 bridge BWSMR026.65 102306	ADEQ TMDL	34 total and 27 dissolved: Mercury 9-24 total and 6-24 dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, zinc 24 total metals only: Boron and manganese 1 Selenium	22-34 samples: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen, dissolved oxygen, and pH	23 *E. coli* bacteria 24 Fluoride 225 Total dissolved solids 20 Suspended sediment concentration 31 Turbidity
At Highway 93 bridge BWSMR026.08 100399	ADEQ Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	09/18/2000 – 4.0 mg/L 09/12/2001 – 2.8 mg/L 07/31/2003 – 5.6 mg/L 09/16/2003 – 3.9 mg/L 09/29/2004 – 4.0 mg/L	Attaining – 4 out 5 samples were taken during low flow conditions. Therefore, only 1 exceedance in 28 samples (binomial).
E. coli bacteria	235 CFU/100 ml FBC	05/08/2001 – 390 CFU/100 ml	Attaining – 1 exceedances in the last 3 years of monitoring (17 samples since this one exceedance).
Mercury	0.6 µg/L FC	08/17/2004 – 0.63 µg/L	Attaining – Only 1 exceedance in 34 samples (binomial).
Mercury (dissolved)	0.01 µg/L A&Ww chronic	07/31/2003 – 0.019 µg/L 08/17/2004 – 0.011 µg/L* 09/20/2004 – 0.012 µg/L# 11/10/2004 – 0.011 µg/L#	Inconclusive – 1 exceedance during the assessment period. Flow on 07/31/2003 was 12.7 cfs. *There is no flow data for 08/17/2004, therefore ADEQ cannot confirm this represents an exceedance. #The samples on 09/20/2004 (95 cfs) and 11/20/2004 (501 cfs) were collected during storm flows; therefore, ADEQ did not assume they represented chronic conditions.
Suspended sediment concentration	Geometric mean 80 mg/L A&Ww	07/31/2003 – 322 mg/L 09/10/2003 – 866 mg/L 08/18/2004 – 9362 mg/L 09/19/2004 – 11,820 mg/L 10/21/2004 – 2410 mg/L 11/23/2004 – 850 mg/L 12/29/2004 – 9374 mg/L 02/24/2005 – 490 mg/L	Inconclusive – All exceedances occurred during high flows; therefore these values could not be used in the geometric mean calculation. Geometric mean of the remaining values did not exceed 80 mg/L

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	**MISSING CORE PARAMETERS**	**MISSING SEASONAL DISTRIBUTION**	**DETECTION LIMITS NOT LOW ENOUGH**
Suspended sediment	Collected all core parameters.		Lab detection limits for selenium and dissolved mercury were higher than A&W chronic criteria in at least 13 samples.
MONITORING RECOMMENDATIONS		High Priority – Collect mercury samples to support TMDL development to evaluate effectiveness of TMDL implementation plans and remediation actions for Alamo Lake. Collect suspended sediment samples due to exceedances. The high SSC values indicate heavy sediment transport. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Collect core parameters to represent at least 3 seasons during an assessment period.	

TROUT CREEK From Cow Creek to Knight Creek 15030201 -- 014 32.1 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Inconclusive FC – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 02/25/2000 – 09/28/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Divide Canyon BWTRT011.97 100670	ADEQ Ambient	8-21 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc 21 total metals only: Boron and manganese 23 total and 16 dissolved: Mercury	20-23 samples: Ammonia, total nitrogen, total phosphorus, nitrite/nitrate, total Kjeldahl nitrogen, dissolved oxygen, and pH	20 *E. coli* bacteria 21 Fluoride 21 Total dissolved solids 10 Suspended sediment concentration 23 Turbidity
Near Wikieup BWTRT002.43 100397	ADEQ Ambient			
At Knight Creek BWTRT000.19 102309	ADEQ TDML			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	06/23/2003 – 5.4 mg/L	Attaining – Low dissolved oxygen due to low flow and ground water upwelling and lack of riffle. Only 1 low DO in23 samples.
E. coli bacteria	235 CFU/100 ml FBC	02/23/2005 – 620 CFU/100 ml	Inconclusive – Only 1 exceedance. Note that the exceedance occurred during flood flow – 1978 cfs, while normal is 1-6 cfs.
Mercury (dissolved)	0.01 µg/L A&Ww chronic	09/20/2004 – 0.039 µg/L	Inconclusive – Only 1 exceedance in the assessment period.
Suspended sediment concentration	Geometric mean 80 mg/L	09/20/2004 – 2031 mg/L	Attaining – Only 1 of 10 samples exceeded the 80 mg/L criterion. It occurred during a high flow event so would not be included in the geometric mean calculation. The remaining samples did not exceed the geometric mean standard.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
E. coli bacteria, mercury	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Ww chronic criterion in at least 11 samples.
MONITORING RECOMMENDATIONS		Medium Priority –Collect mercury and *E. coli* bacteria samples due to exceedances. Use lower lab detection limits for selenium and dissolved mercury. The one high SSC value indicates heavy sediment transport. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted.	

WILDER CREEK	USE SUPPORT	OVERALL ASSESSMENT	
From headwaters to Boulder Creek 15030202 – 007 15.3 Miles	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/29/2000 – 12/31/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Boulder Creek BWWLD000.10 101014	ADEQ TMDL	8 total and dissolved metals: Arsenic, beryllium, copper, lead, manganese, and zinc	6 Dissolved oxygen and 7 pH	None

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient dissolved cadmium, *E. coli* bacteria, and mercury to assess the designated uses.		Lab detection limits for dissolved copper and lead were higher than chronic A&W standards in at least 4 samples each.
MONITORING RECOMMENDATIONS		Low Priority –Collect core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for dissolved lead and dissolved copper	

Colorado – Grand Canyon Watershed

Watershed Description

This watershed is defined by the Colorado River drainage area, beginning in Arizona at Lake Powell, through the Grand Canyon National Park, to Hoover Dam at Lake Mead. It does not include the Little Colorado River drainage. The watershed contains spectacular incised canyons formed by erosion of sandstone formations, as well as volcanically formed mountains and high plateaus.

Land ownership is divided approximately as: 45% federal, 25% tribal, 15% private, and 5% state. Most of the 16,437 square miles in this watershed are sparsely populated, with an approximate population of 67,500 people (2000 census). The largest communities are Kingman and Williams. Land use is primarily open grazing, recreation, and silviculture (forestry), with scattered mining districts. The Grand Canyon National Park, Kaibab National Forest, Lake Mead National Recreation Area, and Glen Canyon National Recreation Area are all located within this watershed and all have restricted land uses to protect natural resources. These federal lands also draw a large number of tourists and recreationists.

Elevations range from 1,000 feet (above sea level) along the Colorado River to 10,400 feet near Flagstaff. The majority of the watershed is between 5,000-7,000 feet elevation, with high desert fauna and flora, including coldwater aquatic communities where perennial waters exist.

Water Resources

Precipitation varies from 10-15 inches a year, including about 1 inch of snowfall per year in higher elevations. Excluding the Colorado River and its reservoirs (Lake Powell and Lake Mead), surface water is sparse.

An estimate of surface water resources in the Colorado – Grand Canyon Watershed is provided in the following table. Waters on Tribal lands are not assessed by ADEQ; therefore, those statistics are shown separately.

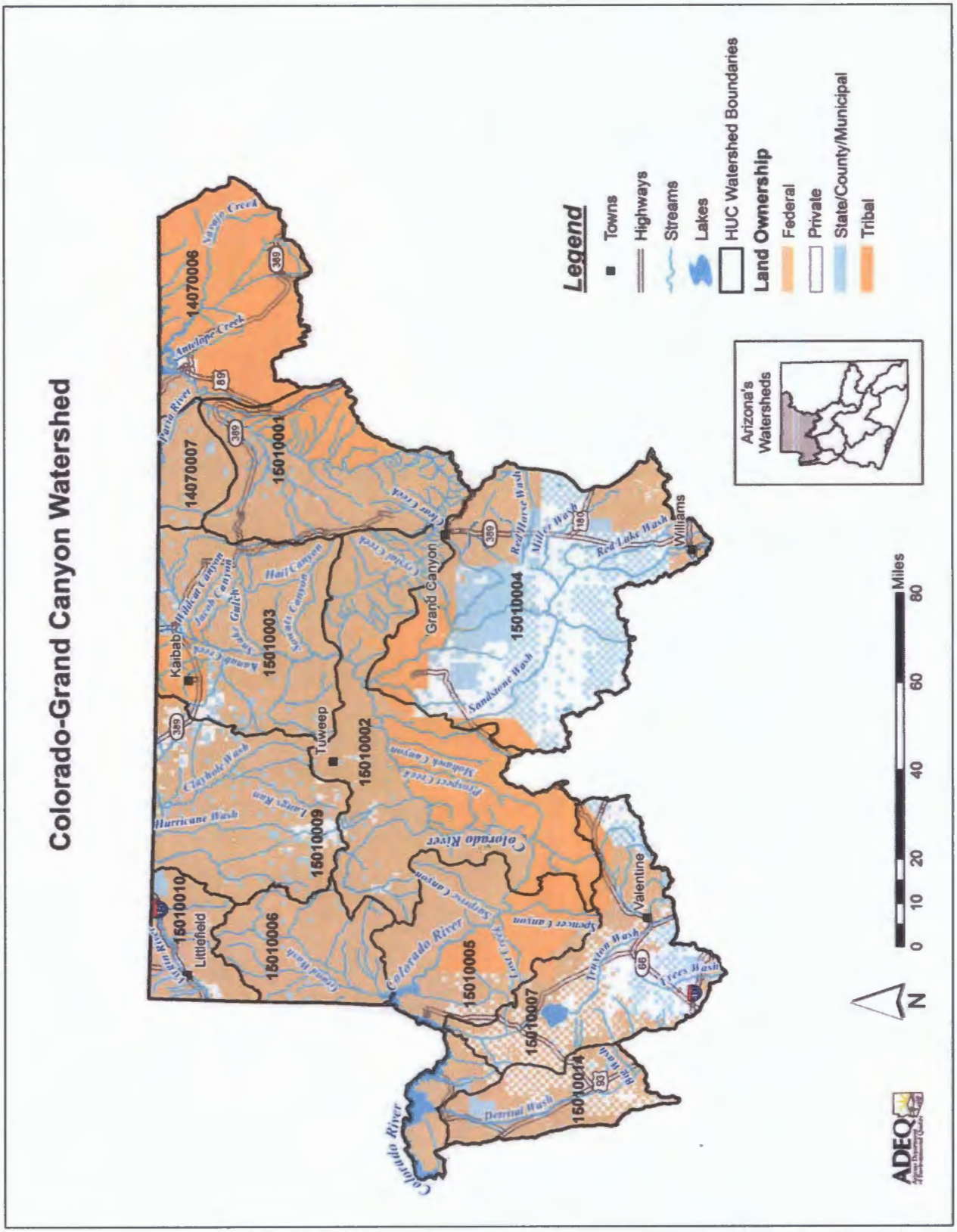
Estimated Surface Water Resources in the Colorado – Grand Canyon Watershed

	Perennial	Intermittent	Ephemeral
Stream miles	480	260	14,870
	Perennial	Non-perennial	
Lake acres	68,400	13,415	

Additional Estimated Water Resources on Tribal Lands – Not Assessed

	Perennial	Intermittent	Ephemeral
Stream miles	125	5	3,740
	Perennial	Non-perennial	
Lake acres	390	0	

Ambient monitoring focuses on perennial waters; however, special investigations may identify water quality problems on intermittent and even ephemeral waters. Estimated miles and acres are based on USGS digitized hydrology at 1:100,000 and have been rounded to the nearest 5 miles or 5 acres.



Watershed Partnerships

- Northwest Arizona Watershed Council
  Their area is defined by three groundwater basins: Hualapai Valley (in the Colorado-Grand Canyon Watershed), Sacramento Basin (in the Colorado-Lower Gila Watershed), and Big Sandy (in the Bill Williams Basin). The council's goal is to protect and preserve water resources and educate the public about water issues related to growth and development. The council meets on the 3rd Wednesday of the month in Kingman, AZ. For information, contact Elmo Roundy (928) 757-2818 or Earl Engelhardt at (928) 692-1068 or imspirit@kingmanaz.net.

Special Studies and Water Quality Improvement Projects

Total Maximum Daily Load Analyses – The following TMDL analyses are scheduled to be completed in this watershed. Further information about the status of these investigations or a copy of the TMDL, if completed, can be obtained at ADEQ's website: www.azdeq.gov.

- The Colorado River below Lake Powell is impaired by selenium, and is impaired near Diamond Creek by suspended sediment (SSC) and selenium. The suspended sediment is at a concentration that represents a risk aquatic coldwater communities. Selenium bioaccumulates and may pose a risk to aquatic life and wildlife that prey on aquatic life (such as birds). Investigations will need to determine source loadings, especially contributions from natural background in this sandstone dominated region and contributions from upstream states (Utah and Colorado). This TMDL is scheduled to be initiated in 2010.

- The Paria River and the Virgin River are impaired due to suspended sediments (SSC).
  Elevated suspended sediment concentrations represent a risk to aquatic communities. Further investigation is needed to determine source loading, especially contributions from natural background in this sandstone dominated region, and contributions from Utah. These TMDLs are scheduled to be initiated in 2010.

Water Quality Improvement Grant Projects – ADEQ awarded the following Water Quality Improvement Grants (319 Grants) in this watershed. More information concerning these grants or projects can be obtained at: http://www.azdeq.gov/environ/water/watershed/fin.html.

- **Composting Restrooms from Hualapai Reservation Project** – Hualapai Indian Tribe (2000 and 2002)
  Composting restrooms were constructed at three beaches used by rafters and campers along the Colorado River in the Grand Canyon National Park to minimize bacterial contamination to the river.

- **The Greater Kingman Wildcat Dump Cleanup Project** -- Northwest Arizona Watershed Council (2000)
  18 wildcat (illegal) dump sites in the Kingman areas were cleaned up to reduce potential surface and ground water contamination. The project also contained education and outreach to solicit community participation and minimize further dumping.

- **Bank Stabilization of Spenser Beach to Protect Composting Restrooms Project** – Hualapai Tribal Nation (2006)
  Funds were used to stabilize eroding banks surrounding the composting restroom at Spencer Beach on the Colorado River in the Grand Canyon.

- **Composting Restrooms at Helipad Project** – Hualapai Tribal Nation (2006)
  A composting restroom was constructed adjacent to a helipad landing area along the Colorado River in the Grand Canyon.

Water Protection Fund Projects – The following Water Protection Fund Projects were awarded by the Arizona Department of Water Resources. For more information about these funds or projects can be obtained at ADWR's web site at http:// www.azwater.gov.

- **Invasive Vegetation in the Grand Canyon National Park Project** – Grand Canyon National Park Foundation (2006)
  Tamarisk and other invasive vegetation were removed at seeps, springs, and tributaries in the Grand Canyon National Park to improve water supplies and riparian conditions.

- **Willow Creek Riparian Restoration Project** – Private land owner (2000)
  Riparian conditions along Willow Creek were restored to reduce sedimentation by replanting native plants, installing temporary irrigation for the new plants, and adding fencing to exclude grazing in the restored area.

Other Water Quality Studies – The following additional water quality related studies were completed since 2000 in this watershed:

- ***The Clean Colorado River Alliance Report (2006)***
  Susan Craig, ADEQ, 2006
  The Clean Colorado River Alliance Report, commissioned by Arizona Governor Janet Napolitano, identified several pollutants of particular concern for the lower Colorado River: nutrients, metals, endocrine disrupting compounds, perchlorate, bacteria and pathogens, salinity/total dissolved solids, and sediment. This report describes the impacts of these pollutants, discusses current mitigation efforts to address them, and sets forth a number of recommendations.

- ***A Monitoring Plan for the Occurrence of Hydrocarbon Constituents in Lake Powell, Mead, and Mohave, (in) Arizona, Nevada, and Utah***
  National Park Service (2004)
  Monitoring is to evaluate the effects of long-term personal watercraft on water quality in large reservoirs.

- ***Variations in Sand Storage Measured at Monumented Cross Sections in the Colorado River Between Glen Canyon Dam and Lava Falls Rapid, Northern Arizona 1992-99*** – Marilyn E. Flynn and Nancy J. Hornewer, U.S. Geological Survey (2003)
  USGS measured bed elevations in 131 cross sections to provide data on channel sand storage. Analyses of cross sections showed limited capacity to store sediment.

- ***Sediment Chemistry of the Colorado River Delta of Lake Powell, Utah, 2001*** – R.J. Hart, H.E. Taylor, R.C. Antweiler, D.D. Graham, G.G. Fisk, S.G. Riggins, and M.E. Flynn (2005)
  Sediment samples at the Colorado River delta of Lake Powell were analyzed to determine the amount of accumulation of various natural and human-introduced chemicals. Three cores and six sediment samples from sediment-water interface were collected near Hite marina where the delta is thickest. Concentrations were typical for delta sediments. Mercury concentrations ranged from 0.2 ng/g to 1,660 ng/g.

- ***Physical and Chemical Characterlstics of Knowles, Forgotten, and Moqui Canyons, and Effects of Recreational Use on Water Quality, Lake Powell, Arizona and Utah*** – R.J. Hart, H.E. Taylor, R.C. Antweiler, G.G. Fisk, G.M. Anderson, D.A. Roth, M.E. Flynn, D.B. Peart, Margot Truini, and L.B. Barber (2004)
  This study documents the concentrations of trace elements, volatile organic compounds, organic wastewater contaminants (including *E. coli* bacteria), and other byproducts of fuel-based contaminants in water and bed material in Lake Lowell during the summers of 2001 and 2002.

- ***Human Health Pharmaceutical Compounds in Lake Mead, Nevada and Arizona, Las Vegas Wash, Nevada, October 2000 –August 2001*** – Robert A. Boyd and Edward T. Furlong, U.S. Geological Survey, Open File Report 02-385 (2002)
  A reconnaissance study to investigate the occurrence of selected pharmaceutical compounds in water samples collected from Lake Mead on the Colorado River and Las Vegas Wash, a waterway used to transport treated wastewater form Las Vegas metropolitan area to Lake Mead. Thirteen of 33 targeted compounds were detected in at least one water sample. The most frequently detected compounds in the

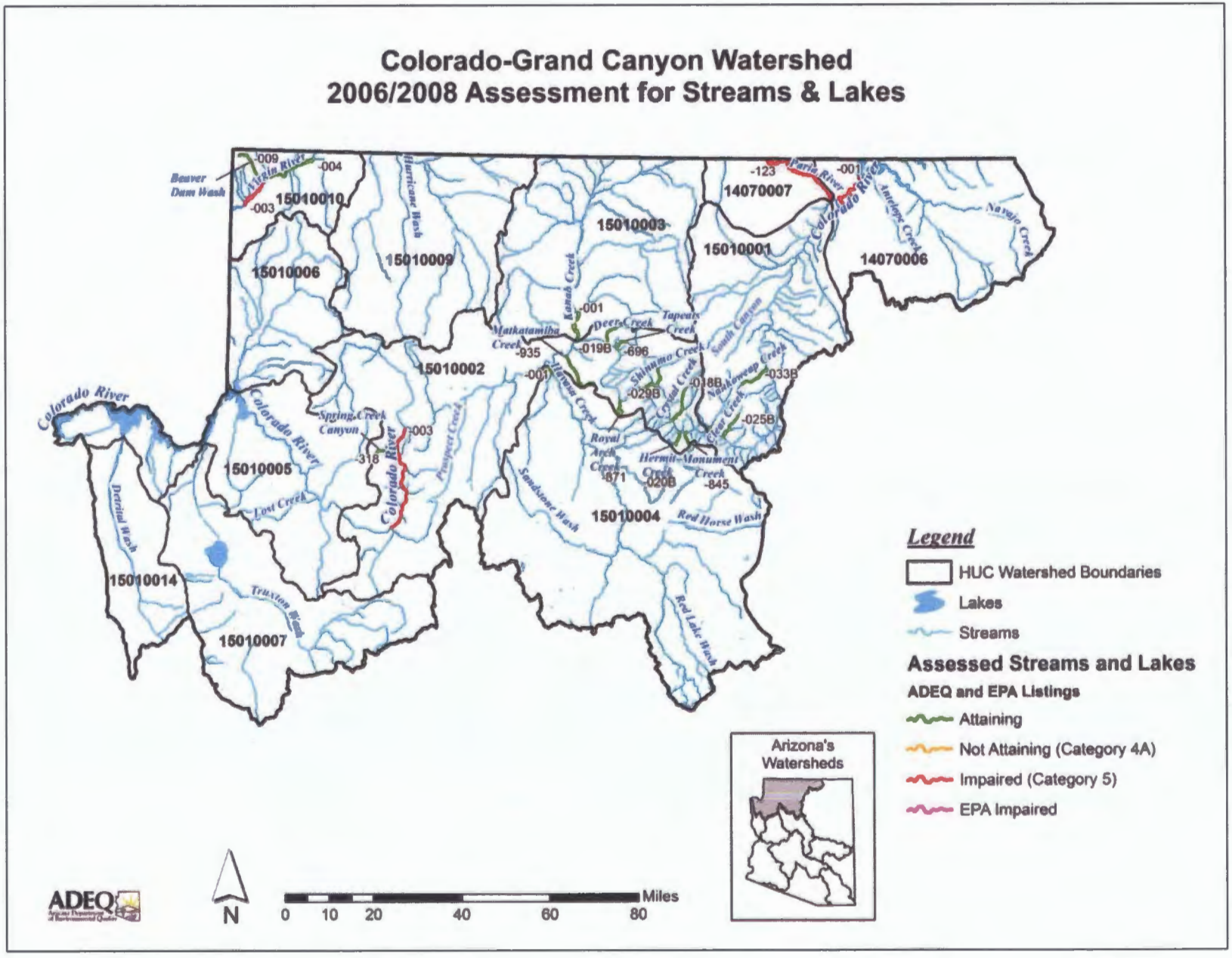
wash were caffeine, carbamazepine (used to treat epilepsy), cotinine (a metabolite of nicotine), and dehydronifedipine (a metabolite of antianginal Procardia).

Assessments

The Colorado – Grand Canyon Watershed can be separated into the following drainage areas in Arizona:

14070006	Lake Powell
14070007	Paria River
15010001	Marble Canyon
15010002	Grand Canyon
15010003	Kanab Creek
15010004	Havasu Creek
15010005	Lake Mead
15010006	Grand Wash
15010007	Red Lake
15010009	Fort Pearce Wash
15010010	Virgin River
15010014	Detrital Wash

These drainage areas and the surface waters assessed as "attaining" or "impaired" are illustrated on the following watershed map. Methods used to complete these assessments are described in the "Surface Water Assessment Methods and Technical Support" document (2006).


Colorado-Grand Canyon Watershed
2006/2008 Assessment for Streams & Lakes
15010010
15010006
15010009
15010003
15010001
14070007
14070006
15010002
15010005
15010004
15010014
15010007
Beaver Dam Wash
Hurricane Wash
Kanab Creek
Paria River
Colorado River
Antelope Creek
Navajo Creek
Matkatamiba Creek
Deers Creek
Tapeats Creek
South Canyon
Shinumo Creek
Crystal Creek
Nankoweap Creek
Clear Creek
Spring Creek Canyon
Prospect Creek
Royal Arch Creek
Hermit-Monument Creek
Sandstone Wash
Red Horse Wash
Red Lake Wash
Dennis Wash
Lost Creek
Truxton Wash
-009
-004
-003
-001
-123
-935
-019B
-696
-029B
-018B
-033B
-025B
-318
-871
-020B
-845
Legend
HUC Watershed Boundaries
Lakes
Streams
Assessed Streams and Lakes
ADEQ and EPA Listings
Attaining
Not Attaining (Category 4A)
Impaired (Category 5)
EPA Impaired
Arizona's Watersheds
ADEQ
N
0 10 20 40 60 80
Miles

BEAVER DAM WASH From Utah border to Virgin River 15010010 -- 009 9.6 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 09/22/2004 – 04/27/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Highway 91 bridge in Littlefield, AZ CGBDW001.19 100449	ADEQ Ambient	3-4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 3-4 total metals only: Boron, chromium, & manganese	4 samples: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 4 Turbidity
Above Virgin River CGBDW000.10 100452	ADEQ Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
E. coli bacteria	235 CFU/100 ml FBC	02/02/2005 – 6143 CFU/100 ml 04/27/2005 – 270 CFU/100 ml	Inconclusive – Although 2 exceedances occurred in the last 3 years of monitoring, only 1 of them was above the screening value of 300 CFU/100 ml. One exceedance (270 CFU) occurred during flood flow. ADEQ will continue to collect samples rather than list at this time.
Lead	15 µg/L FBC	02/02/2005 – 20 µg/L	Inconclusive –1 of 4 samples exceeded criterion.
Suspended Sediment Concentration (SSC)	Geometric mean 80 mg/L A&Ww	02/02/2005 – 500 mg/L 04/27/2005 – 1920 mg/L	Inconclusive – 2 of 4 samples exceeded the 80 mg/L criterion. One value was during a high flow event (1920 mg/L), so could not be used to calculate the geometric mean. Insufficient samples left to calculate two geometric means for assessment.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Lead, *E. coli* bacteria, and SSC	All core parameters were collected		Lab detection limits for selenium and 3 dissolved mercury samples were above the A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority –Collect additional lead, *E. coli* bacteria, and suspended sediment samples due to exceedances. The high suspended sediment concentration indicates sediment transport. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Use lower lab detection limits for selenium and dissolved mercury.	

BRIGHT ANGEL CREEK From Phantom Creek to Colorado River 15010001 -- 019 1.9 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Attaining FC – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/07/2003 – 05/04/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Phantom Ranch CGBRA001.36 100423	ADEQ Ambient	3-5 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4-5 total metals only: Boron, chromium, and manganese	5-6sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	5 *E. coli* bacteria 5 Fluoride 6 Total dissolved solids 5 Suspended sediment concentration 6 Turbidity
Below Phantom Ranch CGBRA000.44 100422	ADEQ Ambient			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Suspended sediment concentration (SSC)	Geometric mean 80 mg/L A&Ww	05/03/2005 – 168 mg/L	Inconclusive – The elevated SSC occurred during a high flow event so could not be used in the Geometric mean calculation. Insufficient samples left to calculate two geometric means and determine impairment.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Suspended sediment	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional suspended sediment concentration samples due to the exceedances. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Use a lower lab detection limit for selenium.	

CATARACT LAKE 15010004 – 0280 35 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive DWS – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 08/14/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam CGCAT - A 100015	ADEQ Ambient	1 total and dissolved metals: Chromium, nickel, silver, zinc. 1 total metal only: Antimony, arsenic, barium, beryllium, boron, cadmium, copper, lead, mercury, selenium, and thallium.	1 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	1 Total dissolved solids 1 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Ammonia	0.40 mg/L at pH 8.8 SU and temperature 22.8 C A&Wc chronic	08/14/2003 – 0.44 mg/L at 1 meter	Inconclusive – Only 1 exceedance.
Manganese	980 µg/L DWS	08/14/2003 – 3830 µg/L	Inconclusive – Only 1 exceedance.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Ammonia and manganese	Insufficient core parameters	Insufficient sampling events.	Lab detection limits for cadmium, copper, and lead above the A&Ww chronic criteria.

MONITORING RECOMMENDATIONS	Medium Priority –Collect ammonia and manganese samples due to the exceedances. High ammonia levels may be a symptom of excess nutrient loadings. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect core parameters to represent at least 3 seasons during an assessment period. Use a lower lab detection limit for cadmium, copper, and lead.

CLEAR CREEK	USE SUPPORT	OVERALL ASSESSMENT	
From unnamed tributary at 360912 / 1115825 to Colorado River 15010001 – 025B 8.1 Miles	A&Ww – Attaining FBC – Attaining FC – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 07/22/2004 – 05/03/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Colorado River CGCLE000.19 101964	ADEQ Ambient	3-4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4 total metals only: Boron, chromium, manganese	4 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Low Priority –Use a lower lab detection limit for selenium.	

COLORADO RIVER From Lake Powell to Paria River 14070006 -- 001 16.3 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Attaining FC – Attaining DWS – Attaining Agl – Attaining AgL – Attaining	Category 5 Impaired	Selenium	Add selenium to the 303(d) List

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/26/2000 – 09/07/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Lees Ferry, AZ USGS #09380000 CGCLR698.93 100743	USGS Ambient	17-20 total and dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc	19-22 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	20 *E. coli* bacteria 22 Fluoride 22 Total dissolved solids 21 Suspended sediment concentration 22 Turbidity 5 Pesticides

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	11/13/2002 – 6.5 mg/L 02/04/2003 – 6.3 mg/L	Attaining – Only 2 of 21 samples showed low dissolved oxygen.
Selenium	2.0 µg/L A&Wc chronic	02/04/2003 – 3.0 µg/L 09/07/2004 – 2.4 µg/L	Impaired – 2 exceedances during the assessment period. Impairment decision supported by downstream reaches that are also listed as impaired due to selenium.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	All core parameters were collected		Lab detection limit for dissolved mercury was above the A&Wc chronic criterion
MONITORING RECOMMENDATIONS		High Priority – Collect selenium samples to support development of the TMDL. Coordinate TMDL development with other selenium TMDLs in the region. Use a lower lab detection limit for dissolved mercury.	

COLORADO RIVER From Parashant Canyon to Diamond Creek 15010002 – 003 27.6 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Inconclusive FC – Inconclusive DWS – Inconclusive Agl – Inconclusive AgL – Inconclusive	Category 5 Impaired	Selenium and suspended sediment	Added sediment and selenium in 2004.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/20/2000 – 01/13/2005 NUMBER AND TYPES OF SAMPLES Metals	Nutrients – Related	Other
Above Diamond Creek USGS #09404200 CGCLR473.00 101483	USGS and ADEQ Ambient	0-1 total and 32-28 dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, manganese, selenium, silver, uranium, and zinc 1 total metal only: Mercury	38-40 sample: total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH 0 Ammonia and nitrite/nitrate	1 Fluoride 1 Total dissolved solids 39 Suspended sediment concentration 12 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Suspended Sediment Concentration	Geometric mean 80 mg/L A&Wc	Too many to list here. Exceedances varied from 88 to 1730 mg/L	Remains impaired – Exceeded 80 mg/L in 23 of 39 samples. Flow is regulated by upstream dam releases, but one result appeared to be during a high flow. Using the remaining data, the geometric mean (of at least 4 consecutive samples) exceeded the standard several times.
Selenium	2 µg/L A&Wc chronic	Too many to list here. All exceedances were only slightly over the standard, ranging from 2.1 to 3.8 µg/L	Remains impaired – Exceeded criterion 21 times during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient total metals (arsenic, lead, chromium, mercury, boron, manganese, and copper), fluoride, and *E. coli* bacteria to assess A&W, FBC, DWS, FC, Agl, and AgL		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		High Priority –Collect samples to support development of suspended sediment and selenium TMDLs. Collect missing core parameters to represent at least 3 seasons during the assessment period. Use a lower lab detection limit for selenium.	

CRYSTAL CREEK From unnamed tributary at 361342 / 1121148 to Colorado River 15010002 – 018B 9.1 Miles	USE SUPPORT	OVERALL ASSESSMENT		
	A&Ww – Attaining FBC – Inconclusive FC – Attaining	Category 2 Attaining some uses		

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 07/22/2004 – 05/03/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Colorado River CGCRY000.05 100525	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4 total metals only: Boron, chromium, manganese	4 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Arsenic	50 µg/L FBC	07/24/2004 – 120 µg/L	Inconclusive – 1 exceedance in 4 samples. Note the relatively high magnitude of the exceedance.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Arsenic	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Medium Priority –Collect arsenic samples due to the exceedance. Use a lower lab detection limit for selenium.	

DEER CREEK	USE SUPPORT	OVERALL ASSESSMENT	
From unnamed tributary at 362616 / 1122815 to Colorado River 15010002 – 019B 4.9 Miles	A&Ww – Inconclusive FBC – Inconclusive FC – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/08/2003 - 05/07/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Colorado River CGDEE000.07 100532	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4 total metals only: Boron, chromium, manganese	4-5 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	3 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 5 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Lead	15 µg/L FBC	07/26/2004 – 38.3 µg/L	Inconclusive – 1 of 4 samples exceeded.
Selenium	2.0 µg/L A&Ww chronic	07/26/2004 – 10 µg/L	Inconclusive – Only 1 exceedance during the assessment period. Lab detection limits for all other samples were higher than A&W chronic criterion, so could not be used to determine attainment.
Suspended sediment concentration	Geometric mean 80 mg/L A&Ww	07/27/2004 – 20,002 mg/L[#]	Inconclusive – #The exceedance occurred during a flash flood event, so could not be used in the geometric mean calculation. Insufficient samples left to calculate two geometric means and determine impairment.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Lead, selenium, suspended sediment	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Medium Priority –Collect more lead, suspended sediment and selenium samples due to exceedances. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Use a lower lab detection limit for selenium.	

DOGTOWN RESERVOIR 15010004 – 0580 70 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Attaining DWS – Inconclusive Agl – Inconclusive AgL – Inconclusive	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 06/20/2001 – 03/19/2002 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Dam CGDOG - A 100019	ADEQ Ambient	4 total metals only: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel selenium, silver, and zinc	4 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	2 *E. coli* bacteria 4 Total dissolved solids 4 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	09/05/2001 – 6.6 mg/L	Inconclusive – Only 1 of 4 samples did not meet standards
pH	<9.0 SU A&Wc, FBC, DWS, Agl, AgL	06/20/2001 – 9.3 SU	Inconclusive – Only 1 of 4 samples did not meet standards
Selenium	2.0 µg/L A&Wc chronic	03/19/2002 – 3.0 µg/L	Inconclusive – Only 1 exceedance during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen, pH, and selenium	Insufficient dissolved metals (cadmium, copper, zinc) and *E. coli* bacteria to assess A&Wc and FBC.		
MONITORING RECOMMENDATIONS	Medium Priority –Collect dissolved oxygen, pH, and selenium samples due to the exceedances. Collect core parameters to represent at least 3 seasons during an assessment period. The old turbidity standard (10 NTU) was exceeded in 3 of 4 visits (22, 31, and 75 NTU). Turbidity, low dissolved oxygen, and high pH may be symptoms of excess nutrient loadings. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring.		

HAVASU CREEK	USE SUPPORT	OVERALL ASSESSMENT	
From Havasupi Indian Reservation to Colorado River 15010004 – 001 3.3 Miles	A&Ww – Attaining FBC – Attaining FC – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/09/2003 – 05/10/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Colorado River USGS #09404115 CGHAV000.36 100568	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4 total metals only: Boron, chromium, manganese	4-5 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 5 Suspended sediment concentration 5 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Low Priority –Use a lower lab detection limit for selenium.	

HERMIT CREEK From Hermit Pack Trail crossing to Colorado River 15010002 – 020B 3.5 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Attaining FC – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 07/24/2004 – 05/05/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Colorado River CGHRM000.08 100570	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4 total metals only: Boron, chromium, manganese 1 Selenium	4 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen 5 Dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Selenium	2.0 µg/L A&Ww chronic	03/05/2005 – 5.4	Inconclusive – Only 1 exceedance during the assessment period. Lab detection limits for all other samples were higher than A&W chronic criterion, so could not be used to determine attainment.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Selenium	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Medium Priority –Collect more selenium samples due to exceedance. Use a lower lab detection limit for selenium.	

KAIBAB LAKE 15010004 – 0710 60 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive DWS – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 08/14/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam CGKAI - A 100027	ADEQ Ambient	1 total and dissolved metals: Cadmium, chromium, copper, lead, nickel, silver, zinc. 1 total metal only: Antimony, arsenic, barium, beryllium, boron, mercury, selenium, and thallium.	1 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	1 Total dissolved solids 1 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events.	
MONITORING RECOMMENDATIONS		Low Priority –Collect core parameters to represent at least 3 seasons during an assessment period.	

KANAB CREEK From Jump-up Canyon to Colorado River 15010003 – 001 12.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Attaining DWS – Inconclusive AgI – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/09/2003 – 05/09/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Colorado River CGKAN000.26 100577	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4 total metals only: Boron, chromium, manganese	4-5 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 5 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Lead	15 µg/L FBC and DWS	07/28/2004 – 28 µg/L	Inconclusive – 1 of 4 samples exceeded the criterion.
Suspended sediment concentration	Geometric mean 80 mg/L A&Ww	07/24/2004 – 1484 mg/L 03/07/2005 – 153 mg/L	Inconclusive – Geometric mean of all 4 SSC samples was 128, which exceeds the 80 mg/L standard. However, a minimum of 2 exceedances of the geometric mean is required to determine impairment.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Lead and suspended sediment	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Medium Priority –Collect more lead and suspended sediment concentration samples due to exceedances. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Use a lower lab detection limit for selenium.	

LAKE POWELL 14070006 – 1130 9770 Acres (In Arizona)	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive DWS – Inconclusive Agl – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 03/32/2004 – 04/14/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Antelope Marina – 102956 Blue Notch – 103011 Bullfrog Marina – 102983 Dangling Rope Marina – 102978 Escalante Creek – 102980 Farley Canyon – 103012 Forgotten 5 – 102984 Halls Crossing Marina – 102981 Knowles 3 – 102985 Lone Rock Beach – 102974 Moqui 4 – 102982 Padre Bay – 102975 Rainbow Bridge – 102977 San Juan River – 102979 State Line – 102973 Wahweep Marina – 102972 Warm Creek Bay - 102976	USGS Special study	None	None	17 Petroleum products 17 Chlorinated hydrocarbons and other VOCs

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Missing core parameters		
MONITORING RECOMMENDATIONS		Low Priority –Collect sufficient core parameters to represent at least 3 seasons during an assessment period.	

MATKATAMIBA CREEK From headwaters to Colorado River 15010002 – 935 12.5 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining	Category 1 Attaining All Uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 07/28/2004 – 05/09/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Colorado River CGMAT000.03 100591	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4 total metals only: Boron, chromium, manganese, and selenium	4sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	3 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 4 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Selenium	2.0 µg/L A&Ww chronic	01/10/2005 – 5.6 µg/L 03/07/2005 – 6.7 µg/L 05/09/2005 – 6.1 µg/L	Attaining – Selenium contamination is entirely due to natural sources in this remote and small drainage in the Grand Canyon National Park.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Low Priority – Use a lower lab detection limit for selenium.	

MONUMENT CREEK	USE SUPPORT	OVERALL ASSESSMENT	
From headwaters to Colorado River 15010002 – 845 3.5 Miles	A&Ww – Inconclusive FBC – Attaining FC – Attaining	Category 2 Attaining Some Uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/07/2003 – 05/05/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Colorado River CGMON000.19 101434	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4 total metals only: Boron, chromium, manganese 2 total metals only: Selenium	4-5sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 5 Total dissolved solids 4 Suspended sediment concentration 5 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Mercury (dissolved)	0.01 µg/L A&Ww chronic	03/04/2005 – 0.13 µg/L	Inconclusive – Only 1 exceedance during the assessment period.
Selenium	2.0 µg/L A&Ww chronic	03/04/2005 – 5.5 µg/L 05/05/2005 – 6.7 µg/L	Attaining – Selenium contamination is entirely due to natural sources in this remote and very small drainage in the Grand Canyon National Park.
Suspended sediment concentration (SSC)	Geometric mean 80 mg/L A&Ww	01/07/2005 – 135 mg/L	Attaining – The criterion (80 mg/L) was exceeded, but the geometric mean of all 4 samples did not exceed the standard.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Mercury	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Medium Priority –Collect additional mercury samples due to the exceedance. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted.	

NANKOWEAP CREEK From unnamed tributary at 361530 / 1115723 to Colorado River 15010001 – 033B 7.3 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Attaining FC – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/05/2003 – 05/02/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Colorado River CGNAN000.20 100594	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4 total metals only: Boron, chromium, manganese	4-5sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 5 Total dissolved solids 4 Suspended sediment concentration 5 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Suspended sediment concentration (SSC)	Geometric mean 80 mg/L A&Ww	01/05/2005 – 932 mg/L	Inconclusive – The elevated SSC occurred soon after a high flow event so could not be used in the geometric mean calculation. Insufficient samples left to calculate two geometric means and determine impairment.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Suspended sediment	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional suspended sediment concentration samples due to the exceedances. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Use a lower lab detection limit for selenium.	

PARIA RIVER From Utah Border to Colorado River 14070007 -- 123 29.4 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired FBC – Impaired FC – Attaining	Category 5 Impaired	Suspended sediment and *E. coli* bacteria	Add *E. coli* bacteria. Added suspended sediment in 2004.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 04/14/2000 – 04/26/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At mile 7.5 CGPAR021.57 101076	ADEQ TMDL	4-9 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc 4-9 total metals only: Boron, manganese, mercury 1 total metals only: Selenium	4-6 samples: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 9 Fluoride 4 Total dissolved solids 30 Suspended sediment concentration 9 Turbidity
Mile 15 CGPAR014.25 101075	ADEQ TMDL			
Mile 22.5 CGPAR008.41 101074	ADEQ TMDL			
Above Colorado River CGPAR001.62 100617	ADEQ Ambient			
At Lees Ferry USGS #09382000 CGPAR001.23 101447	USGS Special Study (SSC)			
At Lees Ferry CGPA000.49 101073	ADEQ TMDL			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
E. coli bacteria	235 CFU/100 ml FBC	07/20/2004 – 2250 CFU/100 ml 01/31/2005 – 317 CFU/100 ml 04/26/2005 – 250 CFU/100 ml	Impaired – 3 exceedances during the assessment period. Two were above the screening value of 300 CFU/100 ml.
Lead	15 µg/L FBC	07/20/2004 – 75 µg/L 11/08/2004 – 49 µg/L 01/31/2005 – 66 µg/L	Inconclusive –3 exceedances in 6 samples. (Requires a minimum of 5 exceedances in 20 samples to determine impairment.)
Suspended Sediment Concentration (SSC)	Geometric mean 80 mg/L A&Ww	Too many exceedances to list here. Results varied from 53 to 70,400 mg/L.11 results were above 10,000 mg/L.	Remains impaired – 20 of 30 samples exceeded the 80 mg/L criterion. Only one result was during high flows. Geometric mean was exceeded repeatedly.
Selenium	2.0 µg/L A&Ww chronic	04/26/2005 – 14 µg/L	Inconclusive – 1 exceedance during the assessment period. Lab detection limits for all other samples were higher than A&W chronic criterion, so could not be used to determine attainment.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	**MISSING CORE PARAMETERS**	**MISSING SEASONAL DISTRIBUTION**	**DETECTION LIMITS NOT LOW ENOUGH**
Lead and selenium	All core parameters were collected		Lab detection limit for selenium was above the A&Wc chronic criterion
MONITORING RECOMMENDATIONS		High Priority – Collect *E. coli* bacteria and suspended sediment concentration samples to support TMDL development. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Collect additional selenium and lead samples due to the exceedances. Use a lower lab detection limit for selenium.	

ROYAL ARCH CREEK From headwaters to Colorado River 15010002 – 871 5.1 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/08/2003 – 05/06/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Colorado River CGRYA000.05 100632	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4 total metals only: Boron, chromium, manganese	4-5sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 5 Total dissolved solids 4 Suspended sediment concentration 5 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Selenium	2.0 µg/L A&Ww chronic	07/25/2004 – 5.1 µg/L 05/06/2005 – 6.0 µg/L	Attaining – Selenium contamination is entirely due to natural sources in this remote and small drainage in the Grand Canyon National Park.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Low Priority – Use a lower lab detection limit for selenium.	

SANTA FE RESERVOIR 15010004 – 1340 12 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive DWS – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 08/14/2003 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam CGSAT - A 100083	ADEQ Ambient	1 total and dissolved metals: Chromium, copper, nickel, zinc. 1 total metal only: Antimony, arsenic, barium, beryllium, boron, cadmium, lead, mercury, selenium, silver	1 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	1 Total dissolved solids 1 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Copper (dissolved)	6.9 µg/L at 49 mg/L hardness A&Wc chronic	08/14/2003 – 10 µg/L	Inconclusive – Only 1 exceedance during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Copper	Insufficient core parameters	Insufficient sampling events.	Lab detection limits for dissolved metals (cadmium, lead, and silver) and thallium were above the A&Ww chronic criteria.

MONITORING RECOMMENDATIONS	Medium Priority –Collect copper samples due to the exceedance. Collect core parameters to represent at least 3 seasons during an assessment period. Use a lower lab detection limit for dissolved metals and thallium. The old turbidity standard (10 NTU) was exceeded and pH was at the standard (9.05 SU), although it did not technically exceed the standard. Turbidity and high pH may be symptoms of nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring.

SHINUMO CREEK From unnamed tributary at 361821 / 1121803 to Colorado River 15010002 – 029B 8.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Attaining FC – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 07/25/2004 – 05/06/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Colorado River CGSHI000.05 100532	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4 total metals only: Boron, chromium, manganese	4-5 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 5 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Suspended sediment concentration	Geometric mean 80 mg/L A&Ww	05/06/2005 – 500 mg/L	Inconclusive – The exceedance occurred during a high flow event, so could not be used in the geometric mean calculation. Insufficient samples left to calculate two geometric means for the assessment.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Suspended sediment	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Medium Priority –Collect more suspended sediment samples due to exceedances. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Use a lower lab detection limit for selenium.	

SPRING CANYON CREEK From headwaters to Colorado River 15010002 – 318 6.0 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/10/2003 – 05/11/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Colorado River CGSPG000.17 100648	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4 total metals only: Boron, chromium, manganese	4-5 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 5 Suspended sediment concentration 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Low Priority –Use a lower lab detection limit for selenium.	

TAPEATS CREEK From headwaters to Colorado River 15010002 – 696 12.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Attaining FC – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 07/26/2004 – 05/07/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Colorado River CGTAP000.08 100662	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, mercury, and zinc 4 total metals only: Boron, chromium, manganese	4-5 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 5 Total dissolved solids 4 Suspended sediment concentration 5 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Suspended sediment concentration (SSC)	Geometric mean 80 mg/L A&Ww	05/07/2005 – 110 mg/L	Inconclusive – The exceedance occurred during a flash flood event, so could not be used in the geometric mean calculation. Insufficient samples left to calculate two geometric means and determine impairment.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Suspended sediment concentration	All core parameters were collected		Lab detection limit for selenium was above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Medium Priority –Collect addition SSC data due to exceedance. Use a lower lab detection limit for selenium.	

VIRGIN RIVER From Black Rock Gulch to Sullivan's Canyon 15010010 -- 006 10.3 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Attaining AgI – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 09/21/2004 – 04/27/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At I-15 rest stop CGVGR052.23 100679	ADEQ Ambient	3-4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, copper, lead, nickel, selenium, silver, thallium, and zinc 3-4 total and 0-1 dissolved: Boron, chromium, manganese, mercury 1 total metals only: Selenium	4 samples: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 4 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
E. coli bacteria	235 CFU/100 ml FBC	09/21/2004 – 720 CFU/100 ml 11/09/2004 – 383 CFU/100 ml	Inconclusive – 2 exceedances during the last 3 years of monitoring; however, one occurred during high flows when bacteria are naturally elevated. More monitoring is needed to determine whether impairment is occurring.
Lead	15 µg/L FBC	11/09/2004 – 89 µg/L	Inconclusive –1 of 4 samples exceeded criterion.
Suspended Sediment Concentration (SSC)	Geometric mean 80 mg/L A&Ww	09/21/2004 – 930 mg/L 11/09/2004 – 5383 mg/L 02/01/2005 – 330 mg/L 04/27/2005 – 2700 mg/L	Inconclusive – All 4 samples exceeded the 80 mg/L criterion. One value was during a high flow event (2700 mg/L), so could not be used to calculate the geometric mean. Insufficient samples left to calculate two geometric means and determine impairment.
Selenium	2.0 µg/L A&Ww chronic	11/09/2004 – 19.0 µg/L	Inconclusive– 1 exceedance during the assessment period. Lab detection limits for all other samples were higher than A&W chronic criterion, so could not be used to determine attainment.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
E. coli bacteria, lead, suspended sediment, and selenium	**All core parameters were collected**		Lab detection limits for selenium and dissolved mercury were above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Medium Priority – Collect E. coli bacteria, lead, SSC, and selenium samples due to exceedances. Use lower lab detection limits for selenium and dissolved mercury.	

VIRGIN RIVER From Sullivan's Canyon to Beaver Dam Wash 15010010 -- 004 9.7 Miles	USE SUPPORT	OVERALL ASSESSMENT
	A&Ww – Inconclusive FBC – Inconclusive FC – Attaining AgI – Attaining AgL – Attaining	Category 2 Attaining some uses

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 09/22/2004 – 04/27/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Littlefield, AZ CGVGR039.41 100680	ADEQ Ambient	3-4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc 3-4 total and 0-1 dissolved: Boron, manganese, mercury 1 total metals only: Selenium	4 samples: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 4 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
E. coli bacteria	235 CFU/100 ml FBC	11/10/2004 – 367 CFU/100 ml 04/27/2005 – 300 CFU/100 ml	Inconclusive – Although 2 exceedances in the last 3 years of monitoring, only 1 of them was above the screening value of 300 CFU/100 ml (other is at the screening value). ADEQ will continue to collect samples rather than list at this time.
Lead	15 µg/L FBC	11/10/2004 – 35 µg/L	Inconclusive –1 of 4 samples exceeded criterion.
Suspended Sediment Concentration (SSC)	Geometric mean 80 mg/L A&Ww	09/22/2004 – 302 mg/L 11/10/2004 – 2900 mg/L 02/01/2005 – 313 mg/L 04/27/2005 – 4500 mg/L#	Inconclusive– All 4 samples exceeded the 80 mg/L criterion. #One value was during a high flow event (4500 mg/L), so would not be used to calculate the geometric mean. Insufficient samples left to calculate two geometric means and determine impairment.
Selenium	2.0 µg/L A&Ww chronic	11/10/2004 – 7.2 µg/L	Inconclusive– 1 exceedance during the assessment period. Lab detection limits for all other samples were higher than A&W chronic criterion, so could not be used to determine attainment.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Lead, *E. coli* bacteria, suspended sediment, and selenium	All core parameters were collected		Lab detection limits for selenium and dissolved mercury were above the A&Ww chronic criterion
MONITORING RECOMMENDATIONS		Medium Priority –Collect additional lead, *E. coli* bacteria, SSC, and selenium samples due to exceedances. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Use lower lab detection limits for selenium and dissolved mercury.	

VIRGIN RIVER From Beaver Dam Wash to Big Bend Wash 15010010 -- 003 10.1 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired FBC – Inconclusive FC – Attaining AgI – Inconclusive AgL – Inconclusive	Category 5 Impaired	Suspended sediment and selenium	Added suspended sediment and selenium in 2004.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/06/2000 – 08/09/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Littlefield, AZ USGS #09415000 CGVGR010.18 (not in ADEQ's database)	USGS Ambient	22 dissolved metals only: Arsenic, boron, selenium	23-25 samples: Ammonia, total phosphorus, nitrate/nitrite, dissolved oxygen, pH	16 *E. coli* bacteria 22 Fluoride 22 Suspended sediment concentration 18 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Boron	1000 µg/L AgI	08/22/2000 – 1020 µg/L	Inconclusive – Only 1 exceedance. Samples were only the dissolved portion. Need total boron samples.
E. coli bacteria	235 CFU/100 ml FBC	03/26/2003 – 520 CFU/100 ml	Inconclusive – Only 1 exceedance in the last 3 years of monitoring.
Suspended Sediment Concentration (SSC)	Geometric mean 80 mg/L A&Ww	Too many to list here. Exceedances ranged from 83 to 5030 mg/L.	Remains impaired – 17 of 22 samples exceeded the standard. Geometric mean of 4 consecutive samples exceeded the 80 mg/L standard repeatedly.
Selenium	2.0 µg/L A&Ww chronic	08/29/2001 – 2.2 µg/L 05/20/2002 – 2.8 µg/L 08/27/2002 – 2.8 µg/L 02/26/2003 – 2.7 µg/L 05/27/2003 – 2.6 µg/L 03/02/2004 – 2.4 µg/L 06/15/2004 – 2.4 µg/L 08/09/2004 – 2.9 µg/L	Remains impaired – 8 exceedances during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Boron and *E. coli* bacteria	Insufficient dissolved metals (cadmium, copper, zinc), mercury, boron, manganese, copper, and lead		
MONITORING RECOMMENDATIONS		High Priority – Collect samples to support development of selenium and suspended sediment concentration TMDLs. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Collect additional boron and *E. coli* bacteria samples due to exceedances. Collect core parameters to represent at least 3 seasons during the assessment period.	

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Colorado – Lower Gila Watershed

Watershed Description

This watershed is defined by the Colorado River drainage area, from Hoover Dam at Lake Mead to the Mexico border near Yuma. It does not include the Bill Williams River drainage or the Gila River above Painted Rocks Dam. Land ownership is divided approximately as: 89% federal, 6% state, 4% tribal, and 1% private. Except for communities along the Colorado River (e.g., Yuma, Bullhead City, Lake Havasu City, Kingman), most of this 14,459 square mile watershed is sparsely populated with only 187,700 people (2000 census).

Due in part to the sparse population, six wildlife refuges and three wilderness areas have been established in this watershed, along with several military bases with live fire exercise areas. All of these have restricted land uses. Tribal and private land is primarily along the Colorado River and lower Gila River and is intensively cultivated. Open grazing occurs across the watershed.

Elevations range from 5,450 feet (above sea level) in the mountains near Lake Mohave to 80 feet along the Colorado River as it flows into Mexico. The area contains low desert fauna and flora, and support warmwater aquatic communities where perennial waters exist.

Water Resources

Precipitation is meager, varying from 3 to 10 inches a year. Perennial water is limited to the Colorado River mainstem and its reservoirs, with irrigation return flow providing perennial flow in the Gila River near Yuma.

An estimate of surface water resources in the Colorado – Lower Gila Watershed is provided in the following table. Waters on Tribal lands are not assessed by ADEQ; therefore, those statistics are shown separately.

Estimated Surface Water Resources in the Colorado – Grand – Lower Gila Watershed

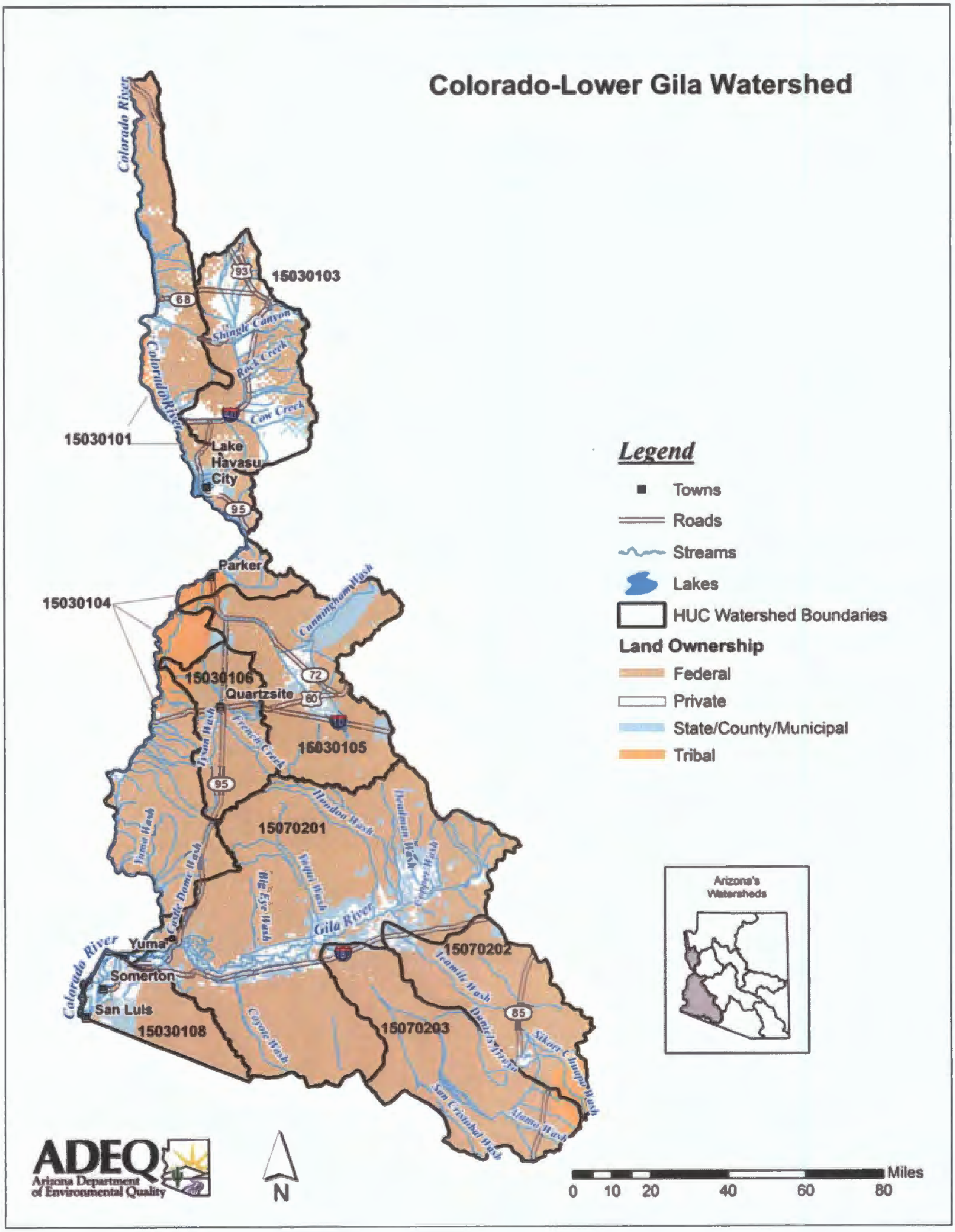
Excluding Tribal Lands

	Perennial	Intermittent	Ephemeral
Stream miles	375	145	13,545
	Perennial	Non-perennial	
Lake acres	36,860	0	

On Tribal Lands – Not Assessed

	Perennial	Intermittent	Ephemeral
Stream miles	75	0	535
	Perennial	Non-perennial	
Lake acres	245	0	

Ambient monitoring focuses on perennial waters; however, special investigations may identify water quality problems on intermittent and even ephemeral waters. Estimated miles and acres are based on USGS digitized hydrology at 1:100,000 and have been rounded to the nearest 5 miles or 5 acres.


Colorado-Lower Gila Watershed
Legend
Towns
Roads
Streams
Lakes
HUC Watershed Boundaries
Land Ownership
Federal
Private
State/County/Municipal
Tribal
15030101
15030103
15030104
15030105
15030106
15030108
15070201
15070202
15070203
Colorado River
Lake Havasu City
Parker
Quartzsite
Yuma
Somerton
San Luis
Gila River
Shingle Canyon
Rock Creek
Cow Creek
Cunningham Wash
Tyson Wash
French Creek
Hoodoo Wash
Deadman Wash
Big Eye Wash
Coyote Wash
Tenmile Wash
San Cristobal Wash
Alamo Wash
Arizona's Watersheds
ADEQ
Arizona Department of Environmental Quality
N
Miles
0 10 20 40 60 80

Watershed Partnerships

- Northwest Arizona Watershed Council
  Their area is defined by three groundwater basins: Hualapai Valley (in the Colorado-Grand Canyon Watershed), Sacramento Basin (in the Colorado-Lower Gila Watershed), and Big Sandy (in the Bill Williams Basin). The council's goal is to protect and preserve water resources and educate the public about water issues related to growth and development. The council meets on the 3rd Wednesday of the month in Kingman, AZ. For information, contact Elmo Roundy (928) 757-2818 or Earl Engelhardt at (928) 692-1068 or imspirit@kingmanaz.net.

Special Studies and Water Quality Improvement Projects

Total Maximum Daily Load Analyses – The following TMDL analyses are scheduled to be completed in this watershed. Further information about the status of these investigations or a copy of the TMDL if completed can be obtained at ADEQ's website: www.azdeq.gov

- The Colorado River below Hoover Dam is impaired by selenium.
  Selenium bioaccumulates and may pose a risk to aquatic life and wildlife that prey on aquatic life (e.g., some birds). Long term monitoring below Hoover Dam will help support TMDL development. Investigations are needed to determine source loadings, especially contributions from natural background and other states (Nevada, Utah, Colorado, and upper Colorado Basin states). The TMDL is scheduled to be initiated in 2010.

- Gila River near Dome is impaired due to boron and selenium.
  Elevated boron can be toxic to plant growth. Selenium bioaccumulates and may pose risks to aquatic life and wildlife that prey on aquatic life. Elevated selenium and boron may be associated with the extensive irrigated agriculture in this area near Yuma. These TMDLs may be complex due to the large number of potential sources, seasonal influences, and natural background considerations.

- Painted Rocks Borrow Pit is impaired due to pesticides contamination in fish and low dissolved oxygen.
  This lake was closed to the public for recreational uses, including fishing, after a fish consumption advisory was issued due to pesticides in fish tissue (DDT metabolites, toxaphene, and chlordane). The pesticide TMDLs for this lake will be developed in association with the ones for several reaches of the Gila River and Painted Rock Reservoir (see TMDL discussion in the Middle Gila Watershed). It is scheduled to be initiated in 2009. A 1992 diagnostic feasibility study by ADEQ indicated that the low dissolved oxygen in the lake was due to the design and maintenance of this shallow lake. During the past several years, the lake has been dry or at best a mud hole, and further representative samples could not be collected. A TMDL will be initiated when there is sufficient water in the lake.

Water Quality Improvement Grant Projects – ADEQ awarded the following Water Quality Improvement Grants (319 Grants) in this watershed. More information concerning these grants or projects can be obtained at: http://www.azdeq.gov/environ/water/watershed/fin.html.

- **The Greater Kingman Wildcat Dump Cleanup Project**
  Northwest Arizona Watershed Council (2000)
  Clean up of 18 wildcat waste dump sites in the Kingman areas to reduce potential surface and ground water contamination. The project also provided education and outreach to solicit community participation and minimize further dumping.

Water Protection Fund Projects – The following Water Protection Fund Projects have been awarded by the Arizona Department of Water Resources. More information about these funds or projects can be obtained from the ADWR web site at: http://www.azwater.gov.

- **Colorado River Indian Tribes 30 Acre Riparian Revegetation Project**
  The Colorado River Indian Tribes (2000)
  Restore 30 acres of riparian area in the Ahakhav Tribal Preserve on Deer Island. This would complement the 75 other acres restored in 1997.

- **Yuma East Wetlands Riparian Revegetation Project**
  The City of Yuma (2004)
  Restore 25 acres of critical riparian habitat along the Colorado River near Yuma.

- **Yuma East Wetlands Restoration Project**
  Quechan Indian Nation (2005)
  Restore 25 acres of riparian area, 20 acres of river channel, and 10 acres of wetland habitat.

Other Water Quality Studies

Water Issues of the Arizona - Mexico Border: The Santa Cruz, San Pedro, and Colorado Rivers.
Terry W. Sprouse, University of Arizona, Water Resources Research Center (2005)
Summary of water quality and water quantity issues facing this region.

Yuma East Wetlands Restoration Plan
The Yuma East Wetlands includes 1,100 acres of riparian habitat, 148 acres of open water, 98 acres of marshland, and 20 acres of agricultural land along the Colorado River, between the Gila River and the Ocean-to-Ocean Bridge in Yuma. The plan is to restore native riparian, wetland, and aquatic habitats along the lower Colorado River and create an interpretive center and nature park for education and low impact recreation opportunities.

The Clean Colorado River Alliance Report
The Clean Colorado River Alliance (2006)
Arizona Governor Janet Napolitano commissioned this study in 2005 to identify the major issues or concerns affecting water quality in the Colorado River. This report identifies several pollutants of particular concern for the lower Colorado River: nutrients, metals, endocrine disrupting compounds, perchlorate, bacteria and pathogens, salinity/total dissolved solids, and sediment. It also describes the impacts of these pollutants, discusses current mitigation efforts to address them, and sets forth a number of recommendations.

Arizona Backwater Manipulations for Endangered Fishes: Management Implications of Selenium on National Wildlife Refuges of the Lower Colorado River
U.S Fish and Wildlife Service (Project ID 22410-1261-2N37) (2006)
Backwater lakes along the Colorado River are used to raise federally listed threatened and endangered native fish. This was a study to determine whether the bioaccumulation of selenium in these backwaters presented a danger to these species. The study documented continued selenium bioaccumulation in crayfish and fishes in 2001 to 2004, but water concentrations of selenium seem diminished in comparison to previous field studies. Fish and Wildlife Service will continue to monitor water sediment and crayfish.

Status of Federal and State Listed Warm Water Fishes of the Gila River Basin, with Recommendations for Management
Desert Fishes Team Report Number 1 (2003)
This report reviews the status of 12 federal and state listed native warm water fishes in the Gila River basin and the post 1967 recovery and conservation actions taken by all agencies, organizations or parties.
General conclusions and recommendations:
- Six species are extirpated from the basin.
- Five species survive in less than 20% of their original range.
- The distribution and abundance of all listed species has declined since their listing and the trend is continuing.

- Although repatriation has been the primary management effort, it has occurred for only a few species and with limited success.
- Few of the recommendations in the biologically-based recovery plans have been implemented.
- Control and removal of nonnative fish species and other aquatic flora and fauna is the most urgent and overriding need in preventing the continued decline and ultimate extinction of the native fish.

Border Crossings – Water and Wastewater at the International Boundary
R.G. Charles Graf and Craig Tinney (ADEQ) and Tom Konner (EPA Region IX)
September/October 2005 Southwest Hydrology (2005)

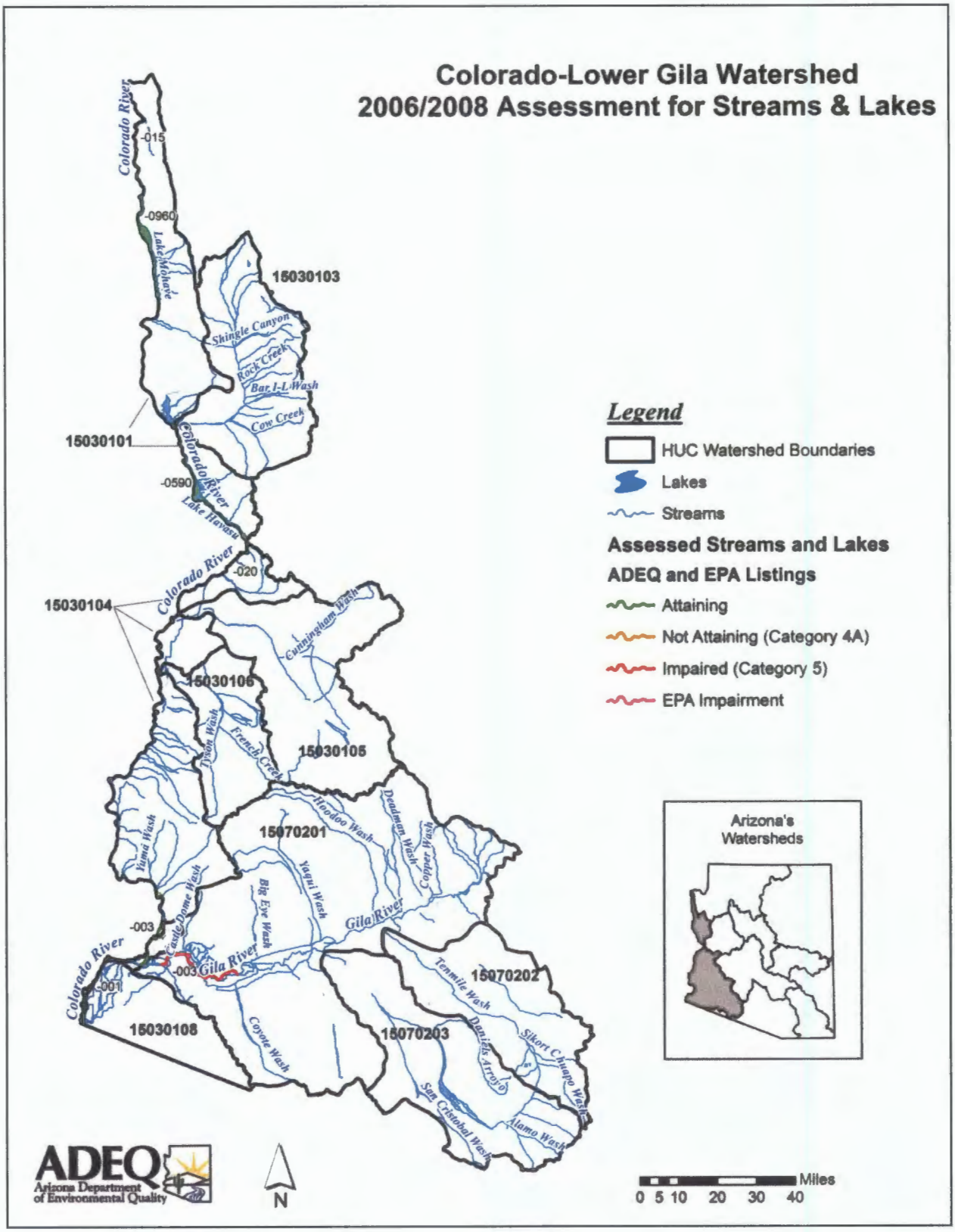
This article describes the problems and progress being made in addressing water quality and wastewater infrastructure along the Mexican border with California and Arizona for seven key populations centers: San Diego/Tijuana, Tecate, Calexico/Mexicali, San Luis/San Luis Rio Colorado (Yuma area), Nogales, Naco/Bisbee, and Douglas/Agua Prieta.

Assessments

The Colorado – Lower Gila Watershed is separated into the following drainage areas (subwatersheds):

15030101	Mohave -Havasu
15030103	Sacramento Wash
15030104	Imperial Reservoir
15030105	Bouse Wash
15030106	Tyson Wash
15030107	Lower Colorado
15030108	Yuma Desert
15070201	Lower Gila
15070202	Tenmile Wash
15070203	San Cristobal Wash

These drainage areas and the surface waters assessed as "attaining" or "impaired" are illustrated on the following watershed map. Methods used to complete these assessments are described in the "Surface Water Assessment Methods and Technical Support" document (2006).


Colorado-Lower Gila Watershed
2006/2008 Assessment for Streams & Lakes
Colorado River
-015
-0960
Lake Mohave
15030103
Shingle Canyon
Rock Creek
Bar I-L Wash
Cow Creek
15030101
Colorado River
-0590
Lake Havasu
Colorado River
-020
15030104
Cunningham Wash
15030106
Tyson Wash
French Creek
15030105
Hoodoo Wash
Deadman Wash
Copper Wash
15070201
Yuma Wash
Big Eye Wash
Yaqui Wash
Gila River
Castle Dome Wash
-003
Colorado River
-003 Gila River
-001
15030108
Coyote Wash
15070203
Tenmile Wash
15070202
Daniels Arroyo
Sikort Chiapo Wash
San Cristobal Wash
Alamo Wash
Legend
HUC Watershed Boundaries
Lakes
Streams
Assessed Streams and Lakes
ADEQ and EPA Listings
Attaining
Not Attaining (Category 4A)
Impaired (Category 5)
EPA Impairment
Arizona's Watersheds
ADEQ
Arizona Department of Environmental Quality
N
Miles
0 5 10 20 30 40

COLORADO RIVER From Hoover Dam to Lake Mohave (below Lake Mead) 15030101 -- 015 40.4 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Inconclusive FC – Attaining DWS – Inconclusive AgI – Attaining AgL – Attaining	Category 5 Impaired	Selenium	Added selenium in 2004

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/12/2000 – 09/09/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Hoover Dam USGS #09421500 CLCLR243.26 (not in ADEQ's database)	USGS Ambient	18-23 dissolved metals only: Antimony, arsenic, barium, boron, cadmium, chromium, cobalt, copper, lead, manganese, nickel, selenium, silver, uranium, and zinc	23 samples: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	23 Total dissolved solids 20 Suspended sediment concentration 9 Turbidity 7-23 Pesticides

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	04/12/2002 – 6.6 mg/L 03/20/2003 – 6.4 mg/L 06/30/2003 – 6.6 mg/L 09/04/2003 – 6.2 mg/L	Inconclusive – 4 of 23 samples were low in dissolved oxygen (binomial)
Selenium	2.0 µg/L A&Wc chronic	03/21/2000 – 3.0 µg/L 04/20/2000 – 3.0 µg/L 02/20/2001 – 2.2 µg/L 05/23/2002 – 2.5 µg/L 03/20/2003 – 2.2 µg/L 04/30/2003 – 2.3 µg/L 09/04/2003 – 2.2 µg/L 03/03/2004 – 2.3 µg/L	Remains impaired – 8 exceedances during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen	Insufficient E. coli bacteria and fluoride to assess FBC and DWS		Lab detection limit for dissolved mercury was higher than the A&W chronic criterion.
MONITORING RECOMMENDATIONS		High Priority – Collect selenium samples to support TMDL development. Collect additional dissolved oxygen samples due to the low readings Collect core parameters to represent at least 3 seasons during an assessment period. Use a lower lab detection limit for dissolved mercury.	

COLORADO RIVER From Bill Williams River to Osborne Wash 15030104 -- 020 13.4 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Attaining FC – Attaining DWS -- Attaining AgI – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/24/2000 – 08/26/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Parker Dam USGS #09427520 CLCLR195.22 100742	USGS Ambient	17-29 total and dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc	19-20 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	17 *E. coli* bacteria 20 Fluoride 20 Total dissolved solids 19 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Selenium	2.0 µg/L A&Ww chronic	10/01/2003 – 3 µg/L	Inconclusive – Only 1 exceedance during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Selenium	Collected all core parameters		Lab detection limit for dissolved mercury was higher than the A&W chronic criterion.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional selenium samples due to the exceedance. Use a lower lab detection limit for dissolved mercury.	

COLORADO RIVER From Imperial Dam to Gila River 15030107 -- 003 15.3 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining DWS -- Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/26/2000 – 08/25/2004 NUMBER AND TYPES OF SAMPLES Metals	Nutrients – Related	Other
Above Imperial Dam USGS # 09429490 CLCLR048.36 100752	USGS Ambient	12-19 total and dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc	12-19 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	11 *E. coli* bacteria 19 Fluoride 19 Total dissolved solids 19 Suspended sediment concentration 18 Turbidity 5 Pesticides

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	08/21/2003 – 5.0 mg/L 08/25/2004 – 5.7 mg/L	Attaining – Only 2 low dissolved oxygen measurements in 18 visits (binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limit for dissolved mercury was higher than the A&W chronic criterion.
MONITORING RECOMMENDATIONS		Low Priority – Use a lower lab detection limit for dissolved mercury.	

COLORADO RIVER From Main Canal to Mexico border 15030107 -- 001 32.2 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired FBC – Attaining FC – Attaining DWS – Attaining AgI – Attaining AgL – Attaining	Category 5 Impaired	Selenium and low dissolved oxygen	Add selenium and dissolved oxygen to the 303(d) List

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/24/2000 – 08/26/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Morelos Dam USGS # 09422000 CLCLR023.30 100744	USGS Ambient	19-30 total and dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc	19-30 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	19 *E. coli* bacteria 30 Fluoride 30 Total dissolved solids 30 Suspended sediment concentration 21 Turbidity 16 Pesticides 3-4 Radiochemicals

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
DDE (dissolved)	0.001 µg/L -- AgI, AgL, FC 0.02 µg/L -- A&Ww chronic 0.1 µg/L – DWS	07/25/2001 – 0.24 µg/L	Inconclusive – Only 1 exceedance of the chronic standard during the assessment period. Only 1 in 16 samples exceeded other standards (binomial).
Diphthalate (dissolved)	0.0001 µg/L – FC 0.002 µg/L – DWS and A&Ww chronic 0.09 µg/L – FBC	07/25/2001 – 0.32 µg/L	Inconclusive – Only 1 exceedance of chronic standard during the assessment period.
Dissolved oxygen	6.0 mg/L A&Ww	06/21/2001 – 5.0 mg/L 07/24/2001 – 5.2 mg/L 08/23/2001 – 5.6 mg/L 08/27/2002 – 5.3 mg/L 07/29/2003 – 5.3 mg/L 08/19/2003 – 5.0 mg/L 08/24/2004 – 5.4 mg/L	Impaired – 7 of 30 samples exceeded standards (binomial).
Alpha Hexachlorocyclohexane	0.006 µg/L – DWS 0.01 µg/L – FC 0.22 µg/L – FBC	07/25/2001 – 0.31 µg/L	Attaining – Only 1 exceedance in 13 samples exceeded standards (binomial)
Gamma Hexachlorocyclohexane (Lindane)	0.2 µg/L – DWS 0.28 µg/L – A&Ww chronic	07/25/2001 – 0.42 µg/L	Inconclusive – Only 1 exceedance during the assessment period.
Mercury (dissolved)	0.01 µg/L A&Ww chronic	08/19/2003 – 0.3 µg/L	Inconclusive – Only 1 exceedance during the assessment period. The lab detection limit on all other mercury samples was above the chronic standard, so they could not be used to determine attainment.

Mercury (dissolved)	0.01 µg/L A&Ww chronic	08/19/2003 – 0.3 µg/L	Inconclusive Only 1 exceedance during the assessment period.
Selenium	2.0 µg/L A&Ww chronic	05/20 2003 – 3.0 µg/L 08/19/2003 – 3.0 µg/L 08/24/2004 – 2.5 µg/L	Impaired – 3 exceedances during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	**MISSING CORE PARAMETERS**	**MISSING SEASONAL DISTRIBUTION**	**DETECTION LIMITS NOT LOW ENOUGH**
DDE, diphthalate, Gamma hexachlorocyclohexane, and mercury	Collected all core parameters		Lab detection limit for dissolved mercury was higher than the A&W chronic criterion.
MONITORING RECOMMENDATIONS		High Priority – Collect samples to support dissolved oxygen and selenium TMDLs. Collect additional DDE, diphthalate, Gamma hexachlorocyclohexane, and mercury samples due to the exceedances. Use a lower lab detection limit for dissolved mercury.	

GILA RIVER From Coyote Wash to Fortuna Wash 15070201 -- 003 28.3 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Inconclusive FBC – Inconclusive FC – Attaining AgI – Impaired AgL – Attaining	Category 5 Impaired	Boron, selenium	Added boron and selenium in 2004

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 02/16/2000 – 05/18/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Dome, AZ CLGLR010.53 100455	ADEQ and USGS Ambient	8-22 total and dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium, and zinc. 22 total metals only: Boron and manganese	21-22 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	17 *E. coli* bacteria 22 Fluoride 18 Total dissolved solids 11 Suspended sediment concentration 22 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Boron	1000 µg/L AgI	02/16/2000 – 1200 µg/L 03/21/2000 – 1500 µg/L 11/01/2001 – 1200 µg/L 05/21/2003 – 1100 µg/L 02/18/2004 – 1100 µg/L 04/23/2004 – 1700 µg/L	Remains impaired – 6 exceedances in 22 samples (binomial).
Dissolved oxygen	6.0 mg/L A&Ww	09/21/2000 – 3.2 mg/L 05/31/2001 – 5.2 mg/L 09/15/2001 – 3.4 mg/L 08/20/2002—3.5 mg/L	Inconclusive – 4 low dissolved oxygen measurements in 22 samples (Binomial method requires a minimum of 5 exceedances to be assessed as impaired.)
E. coli bacteria	235 CFU/100 ml FBC	02/22/2005 – 290 CFU/100 ml	Inconclusive – Only 1 exceedance in the last 3 years. Lab result did not exceed the screening value (300 CFU/100 ml).
Selenium	2.0 µg/L A&Ww chronic	03/21/2000 -- 5.4 µg/L	Remains impaired – Only 1 exceedance during the assessment period. The lab detection limit for all other samples was above the A&Ww chronic criterion, so they could not be used to determine attainment.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen and *E. coli* bacteria	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than the A&W chronic criteria in at least 17 samples.
MONITORING RECOMMENDATIONS		Medium Priority – Collect samples to support boron and selenium TMDL development. Collect dissolved oxygen and *E. coli* samples due to exceedances. Use a lower lab detection limit for selenium and dissolved mercury.	

HUNTER'S HOLE (Colorado River backwater) 15030108 -- 0660 15 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 09/08/2000		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid lake CLHUN - B 102548	AGFD Ambient	1 total metals only: Chromium, copper, lead, manganese, mercury, selenium	1 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen	1 Fluoride 1 Total dissolved solids

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Selenium	20 µg/L A&Ww acute	09/08/2000 – 22 µg/L	Inconclusive – Only 1 exceedance in last 3 years of monitoring. Magnitude of the exceedance should be noted.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Selenium	Insufficient core parameters	Insufficient sampling events.	Lab detection limit for total mercury was higher than the FC criterion.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional selenium samples due to the exceedance. Collect sufficient core parameters to represent at least 3 seasons during an assessment period. Use a lower lab detection limit for mercury.	

LAKE HAVASU 15030101 -- 0590 19,780 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Attaining FC – Inconclusive AgI – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 03/03/2000 – 09/09/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Bass Bay - 102349 Body Beach – 100123 East State Beach – 100124 Nautical Beach – 100152 North Channel – 100168 Pilot Rock – 100157 South Channel – 100164 West State Beach – 100171 Bighorn Point – 102350 Cattail Cove – 102351 Crazy Horse Beach – 102352 Friendly Island – 102353 Frog Point – 120354 North Rotary Beach - 100123 Partners Point – 102355 Rocky Landing – 102368 Sandpoint Marina – 102356 Satellite Cove – 102357 Solitude Cove – 102358 South Rotary Beach – 100121 Standard Wash Cove – 102359 Steamboat Cove – 102360 Three Dunes Cove – 102361 Up river – 102362 Windsor #4 – 102364 Windsor Cove – 102363 Wren Cove – 102349	Mohave County Health Dept Beach Monitoring (*E. coli* bacteria)	14-33 total and dissolved metals: Antimony, arsenic, barium, beryllium, boron cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc 9 total metals only: Thallium	29-33 samples: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen 32 Dissolved oxygen 33 pH	1285 *E. coli* bacteria 34 Fluoride 31 Total dissolved solids 36 Turbidity
Body Beach – 100132 Cattail Cove – 100124 Crazy Horse Cove – 100139 London Bridge – 100150 Middle Rotary Beach - 100122 Nautical Cove – 100151 North Rotary Beach - 100123 South Channel – 100164 South Rotary Beach - 100121 Windsor Beach – 100130 Off Windsor Beach - 100155	ADEQ Ambient (*E. coli* bacteria and field measurements)			
Parker Dam - 100098 At Colorado River – 100101 Mid Lake – 100102 Mid Thompson Bay – 100170 Site C – 100099	ADEQ Ambient			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
E. coli bacteria	235 CFU/100 ml	East State Beach Shoreline 05/17/2000 – GT 2000 CFU/100 ml 05/24/2000 – 1470 CFU/100 ml Crazy Horse Beach 05/17/2000 – 340 CFU/100 ml Up River 05/19/2000 – GT 2000 CFU/100 ml West State Beach Shore 05/24/2000 – 1040 CFU/100 ml Windsor Cove 05/24/2000 – 260 CFU/100 ml Nautical Beach 07/18/2000 – GT 2395 CFU/100 ml Bass Bay 08/31/2000 – 368 CFU/100 ml Windsor #4 06/21/2001 – 240 CFU/100 ml Standard Wash Cove 05/23/2002 – 501 CFU/100 ml	Inconclusive – Two exceedances at one beach, but none at that beach in the last 3 years of monitoring. Only 1 exceedance at 8 other sites. Note that only 2 exceedances occurred after 2000, and they were at different beaches. (See additional discussion below.) 99.99% of samples attained the E. coli standard.
Mercury (dissolved)	0.01 µg/L – A&Ww chronic 0.6 µg/L – FC	11/28/2001 – 0.8 µg/L (at 2 sites on that date)	Inconclusive – For A&Ww assessment, only 1 exceedance during the assessment period. -- For FC assessment, only 1 of 5 sampling events with an exceedance (2 of 8 samples, as exceedance occurred at 2 sites on the same date) (binomial).
Selenium	2.0 µg/L A&Ww chronic	05/08/2001 – 4 µg/L 09/30/2003 – 3 µg/L	Inconclusive – 2 exceedances in a 3 year period; however, both exceedances occurred near the lab detection limit (2 µg/L). Will continue to monitor selenium levels.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Mercury and selenium	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria in at least 9 samples.
ESCHERICHIA COLI BACTERIA EXCEEDANCES		Because of the size of this reservoir, ADEQ assesses the bacteria exceedances at each site separately, rather than combining all exceedances.	
MONITORING RECOMMENDATIONS		Medium Priority –Continue bacterial monitoring at beaches. Collect additional mercury and selenium samples. (Note that the Colorado River is impaired based on selenium in upstream reaches.) Use lower lab detection limits for selenium and dissolved mercury.	

LAKE MOHAVE 15030101 -- 0960 27,045 Acres (Arizona side)	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Attaining DWS – Attaining AgI – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 04/03/2003 – 10/29/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Davis dam CLMOH - A 100030	ADEQ Ambient	3 total and 3 dissolved metals: Cadmium, chromium, copper, lead, nickel, silver, and zinc 3 total and 0-2 dissolved metals: Antimony, arsenic, barium, beryllium, boron, manganese, mercury, selenium, and thallium	3 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	1 *E. coli* bacteria 3 Fluoride 3 Total dissolved solids 2 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Selenium	2.0 µg/L A&Wc chronic	10/01/2003 – 3 µg/L	Inconclusive – Only 1 exceedance during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Selenium	Insufficient *E. coli* bacteria samples to assess FBC.		Lab detection limit for dissolved mercury was higher than the A&W chronic criterion.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional selenium samples due to the exceedance. Collect sufficient core parameters to represent at least 3 seasons during the assessment period. Use a lower lab detection limit for dissolved mercury.	

MARTINEZ LAKE 15030104 -- 0880 600 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 08/22/2002 – 06/10/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid Lake CLMAZ - A 101790	ADEQ Ambient	3 total and dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc	3 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, pH 2 Dissolved oxygen	3 *E. coli* bacteria 3 Fluoride 3 Total dissolved solids 3 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limit for dissolved mercury was below the A&W chronic criterion.
MONITORING RECOMMENDATIONS		Low Priority –Use a lower lab detection limit for dissolved mercury.	

MITTRY LAKE 15030107 -- 0950 385 acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Attaining FC – Inconclusive	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 06/10/2003 – 08/22/2002		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam CLMIT - A 100030	ADEQ Ambient	3 total and 0-2 dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium copper, lead, manganese, mercury, nickel, selenium, silver, thallium and zinc	2 sample: Ammonia, total nitrogen, total phosphorus, nitrate/nitrite, total Kjeldahl nitrogen 3 Dissolved oxygen, pH	3 *E. coli* bacteria 2 Fluoride 2 Total dissolved solids 3 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Need dissolved metals (cadmium, copper, and zinc), mercury, fluoride, arsenic, chromium, lead, boron, manganese, and copper to assess A&Ww, FC, DWS, AgI, and AgL.		Lab detection limit for dissolved mercury was higher than the A&W chronic criterion.
MONITORING RECOMMENDATIONS		Low Priority –Collect sufficient core parameters to represent at least 3 seasons during the assessment period. Use a lower lab detection limit for dissolved mercury.	

PAINTED ROCK BORROW PIT LAKE 15070201 -- 1010 185 Acres	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Ww – Impaired FBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 5 Impaired	Low dissolved oxygen	Dissolved oxygen listed in 1992.
	EPA	FC – Impaired	Category 5 Impaired	DDT metabolites, toxaphene, and chlordane	EPA relisted pesticides in 2002.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 03/21/2000 – 04/10/2001 (dry or nearly dry since)		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid lake CLPRL - B 100050	USFWS for Corp of Engineers Ambient	1 total metals: Arsenic, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, silver, and zinc	2 samples: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen 5 Dissolved oxygen, pH	1 Total dissolved solids

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	05/10/2000 – 3.0 mg/L 06/13/2000 – 3.4 mg/L	Remains impaired – 2 exceedances in 5 sampling events. Insufficient water in the lake since 2000 to monitor.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters		Lab detection limit for selenium was higher than the A&W chronic criterion.

DISCUSSION OF PESTICIDE IMPAIRMENT	Evidence of potential pesticide impairment: • A risk assessment completed in 2006 supports continuation of the fish consumption advisories. • Fish consumption advisories for pesticides in effect since 1991.
MONITORING RECOMMENDATIONS	High Priority – Collect pesticide and dissolved oxygen samples to support TMDL development. (Must wait for lake to refill and stabilize. Has been dry for several years due to the extended drought.) Collect sufficient core parameters to represent at least three seasons during an assessment period. Use a lower lab detection limit for selenium.

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Little Colorado River Watershed

Watershed Description

This watershed is defined by the Little Colorado River, from its headwaters to the Colorado River, and tributaries to the San Juan River which flow into north and east into New Mexico and Utah. This area contains horizontally stratified sandstone and limestone which have eroded to form canyon and plateaus. In a few areas, igneous rocks have deposited on sedimentary formations due to volcanic activity. Natural erosion can be easily increased by human activities in such locations.

Land ownership is divided approximately as: 60% tribal, 12% federal, 12% private, 6% state. This 26,794 square mile watershed is sparsely populated outside of Flagstaff, with 236,500 people (including Flagstaff) (2000 census). Land use is primarily open grazing, forestry, recreation, and mining. The area contains four national monuments, four wilderness areas, and two national forests with varying levels of use restrictions.

Elevations range from 12,600 feet (above sea level) at Humphrey's Peak near Flagstaff to 2,700 feet near the Colorado River. However, most of the watershed is above 5000 feet elevation, with desert highlands flora and fauna, and coldwater aquatic communities where perennial waters exist.

Water Resources

The climate provides approximately 10 inches of rain and 15 to 20 inches of snow yearly. Snow melt has been a primary source of water for this region. The flow on the Little Colorado River is "interrupted" (stretches of perennial, intermittent, and ephemeral flow). Perennial flow is generally limited to headwaters streams.

An estimate of surface water resources in the Little Colorado Watershed is provided in the following table. Waters on Tribal lands are not assessed by ADEQ; therefore, those statistics are shown separately.

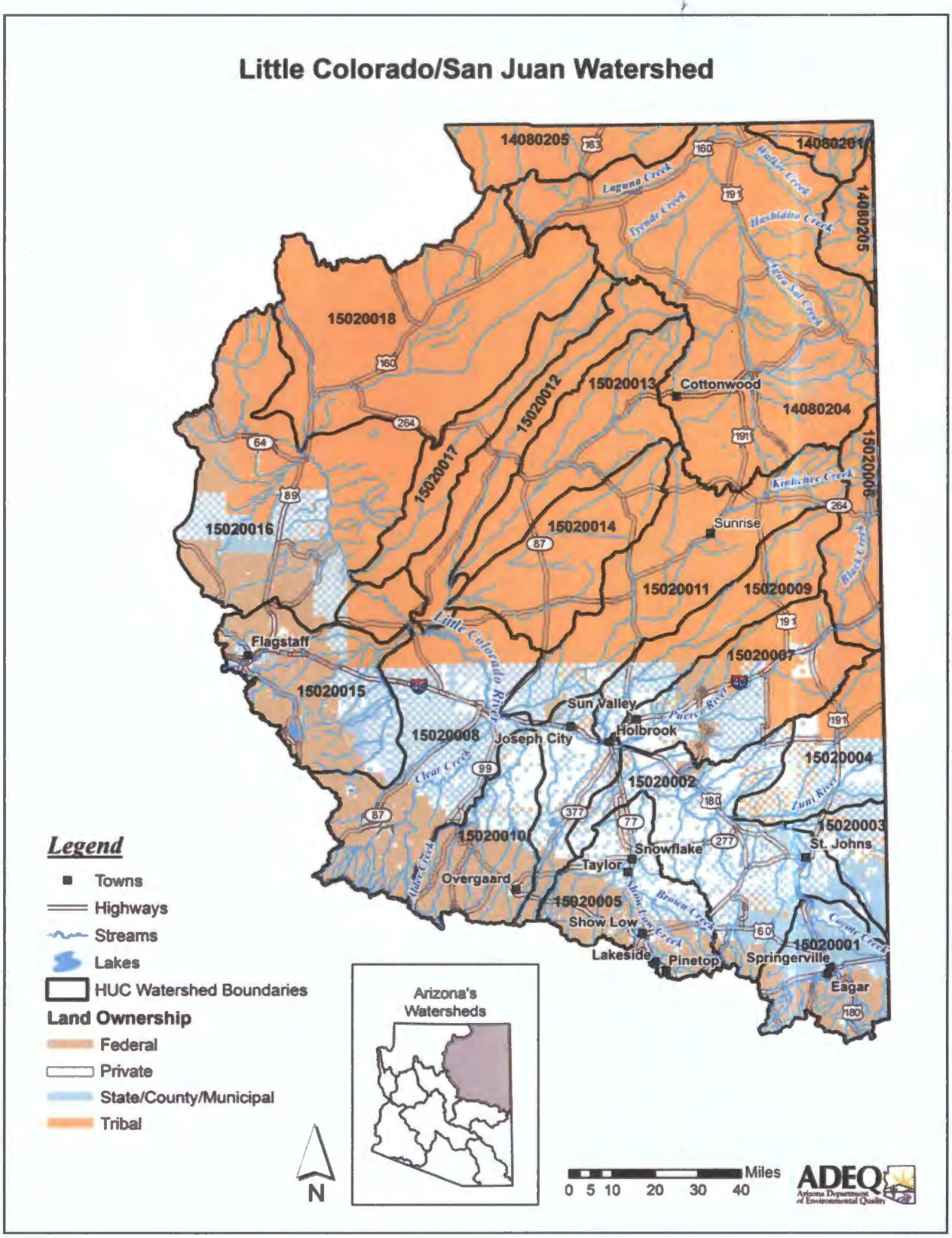
Estimated Surface Water Resources in the Little Colorado Watershed

	Perennial	Intermittent	Ephemeral
Stream miles	640	1,655	9,635
	Perennial	Non-perennial	
Lake acres	16,050	6,830	

On Tribal Lands – Not assessed

	Perennial	Intermittent	Ephemeral
Stream miles	305	170	15,310
	Perennial	Non-perennial	
Lake acres	5,295	118	

Ambient monitoring focuses on perennial waters; however, special investigations may identify water quality problems on intermittent and even ephemeral waters. Estimated miles and acres are based on USGS digitized hydrology at 1:100,000 and have been rounded to the nearest 5 miles or 5 acres.


Little Colorado/San Juan Watershed
14080205
14080201
15020018
15020013
Cottonwood
14080204
15020012
15020017
15020016
15020014
Sunrise
15020011
15020009
Flagstaff
15020007
15020015
Sun Valley
Holbrook
15020008
Joseph City
15020004
15020002
15020003
St. Johns
15020010
Snowflake
Taylor
Overgaard
15020005
Show Low
Lakeside
Pinetop
Springerville
15020001
Eagar
Legend
Towns
Highways
Streams
Lakes
HUC Watershed Boundaries
Land Ownership
Federal
Private
State/County/Municipal
Tribal
Arizona's Watersheds
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Miles
ADEQ
Arizona Department of Environmental Quality

Watershed Partnerships

- **Little Colorado River Watershed Coordinating Council**
  This council looks at water quality and quantity issues across an immense watershed coving nearly 27,000 square miles that includes parts of New Mexico. They coordinate and encourage efforts by the smaller subwatershed listed below. The council meets in Holbrook or Winslow for quarterly meetings. For information contact: Ronald Smith, Project Director, at (928) 367-335 or rsmith@whitemtns.com; Jim Boles, Chair, 928-298-2422; or Larry Winn, Vice Chair, 505-879-3060.

  The following subwatersheds groups are also meeting and working on projects:
  - Show Low Creek Group – Tom Thomas at (928) 368-8885, tthomas@ci.pinetop-lakeside.az.us;
  - Silver Creek Advisory Commission – Ron Solomon, (928) 536-7366, ron@tayloraz.org; or Kerry Ballard, (928) 536-2539;
  - Upper Little Colorado River Partnership (above Lyman Lake) – Bill Greenwood, (928) 333-4128 x226, bgreenwood@eagar.com.

Special Studies and Water Quality Improvement Projects

Total Maximum Daily Load Analyses – The following TMDL analyses are scheduled to be completed in this watershed. Further information about the status of these investigations or a copy of the TMDL if completed can be obtained at ADEQ's website: www.azdeq.gov

- Nutrioso Creek is impaired by suspended sediment (turbidity).
  A TMDL was completed in 2000. Field investigations found that historic grazing and some forestry practices had contributed to a loss of riparian vegetation and stream entrenchment. Healthy riparian areas are needed to stabilized stream banks and dissipate stream energy during high flow events. Stream entrenchment causes a loss of flood plain, which leads to further increased stream velocity and related shear stress during higher flows. The silty-organic clay soils in this area are highly susceptible to water transport. The TMDL identified a variety of management practices to improve cattle grazing and forestry practices. Several of these have been implemented and effectiveness monitoring is ongoing.

- Rainbow Lake is impaired by nutrient loadings, high pH, and low dissolved oxygen.
  Excess nutrients can lead to high pH and low dissolved oxygen, algal blooms and even fish kills. A nutrient TMDL was approved in 2000. Nutrient load reductions were assigned to several sources to achieve water quality standards:
  - Septic systems – 75% reduction in nitrogen loading,
  - Runoff (residential, commercial, agricultural, and forests) – 50% reductions in nitrogen and phosphorus loadings.
  - Macrophyte (aquatic plant) decomposition – 50% reductions in nitrogen and phosphorus loadings

  ADEQ is working with landowners and other interested stakeholders to implement strategies identified in the TMDL to achieve water quality standards. Further monitoring is scheduled to determine whether these strategies have been successful.

- The Little Colorado River near Springerville is impaired by suspended sediment (turbidity).
  Suspended sediment which causes high turbidity readings represents a risk to aquatic life. A turbidity/suspended sediment TMDL was completed in 2002. The investigation indicated that sediment loadings actually start upstream of these segments. The main cause of the suspended sediments is loss of vegetative cover due to historic grazing practices. Loss of vegetation, especially in the riparian area, allows increased runoff, soil erosion, and bank destabilization. Effective management strategies include increasing riparian vegetation, stream bank stabilization, maintenance of flood plains, and minimization of the impact of cattle in the general area. ADEQ has been working with landowners and other interested stakeholders to implement strategies to reduce sediment transport in the Little Colorado River. Further monitoring to determine the effectiveness of implemented strategies is ongoing.

- The Little Colorado River near Joseph City is impaired due to copper, silver, and suspended sediment concentration (SSC). These pollutants pose a risk to aquatic life and wildlife. Further monitoring is needed to identify sources in this drainage area. TMDLs will be initiated in 2007.

- The Little Colorado River near Woodruff is impaired due to *E. coli* bacteria and suspended sediment. *Escherichia coli* contamination presents a significant public health concern if people are swimming or even wading in the water. A bacteria TMDL will be initiated in 2007. Monitoring for the sediment TMDL will occur in conjunction with monitoring for the other TMDLs on the Little Colorado River.

- Lakes in the Lake Mary region near Flagstaff are impaired by mercury: Upper Lake Mary, Lower Lake Mary, Lower Long Lake, Soldiers Lake, and Soldiers Annex Lake.
  Fish consumption advisories have been issued at each of these lakes because consumption of mercury poses risks to humans who eat the fish. Mercury also poses risks to other animals that prey on the fish.

  A draft model development report for the Lake Mary region (Malcolm Pirnie, 2006) indicates that mercury is from indirect sources such as: air deposition to the lake and to the watershed (transported to the lakes via runoff), ground water, and natural background. Several remediation scenarios were evaluated using the model: lake aeration, sediment dredging, watershed load reduction, lake level management, and fisheries management. This analysis indicated that reduction of water column concentrations would require reductions in atmospheric loads directly and by reducing soil erosion in the watershed. A draft TMDL should be completed in 2006.

- Lyman Lake (near Springerville) is also impaired by mercury.
  A fish consumption advisory has been issued at this lake because consumption of mercury poses risks to humans who eat the fish. Mercury also poses risks to other animals that prey on the fish.

- Bear Canyon Lake is impaired by low pH (alkaline conditions)
  Low pH conditions can negatively impact most designated uses (swimming, aquatic life, agriculture). A TMDL is scheduled and will investigate whether sources of this water quality problem.

Water Quality Improvement Grant Projects – ADEQ awarded the following Water Quality Improvement Grants (319 Grants) in this watershed. More information concerning these grants or projects can be obtained at: http://www.azdeq.gov/environ/water/watershed/fin.html.

- **EC Bar Ranch Turbidity Reduction Projects**
  EC Bar Ranch (2000, 2001, 2002, 2003, 2004, and 2005)
  Restore riparian conditions by exclude cattle from riparian areas and provide alternative water sources for cattle. This should result in stream bank stabilization and reductions in sediment loading to Nutrioso Creek.

- **Rogers Ranch Turbidity Reduction Project**
  Rogers Ranch (2000)
  Restore riparian vegetation and stream bank stability by excluding cattle from riparian areas and providing alternative water sources along Nutrioso Creek.

- **Big Ditch Water Quality Improvement Project**
  The Town of Eager (2000)
  Line "Big Ditch", an irrigation canal, to reduce leakage and improve riparian growth.

- **Murray Basin – Saffel Canyon Phase II Project**
  The Apache Sitgreaves National Forest (2001)
  Restore stream channels to their natural form and function on two severely degraded tributaries to Nutrioso Creek. Project includes realigning and regrading roads, obliterated some roads, and revegetated some disturbed sites in the Apache Sitgreaves National Forest.

- **Overgaard Townsite Water Protection Project**
  The Overgaard Domestic Wastewater Improvement District (2001, 2004)
  Connect 20 homes to a 10,000 gallon septic tank and leach field to protect public health and underlying aquifers and nearby streams.

- **Greenwood Sediment Reduction Project**
  The Apache Sitgreaves National Forest (2001)
  Reconstruct and realign forest roads to reduce sediment contributions to Nutrioso Creek. Erosion stabilization techniques were applied to control active head-cutting and bank erosion caused by roads.

- **Best Management Practices for Wastewater Treatment at Tolani Lake Project**
  The Navajo Nation (2001)
  Develop a modern wastewater lagoon system and constructed wetland at Tolani Lake. The project was used to teach and promote best management practices associated with the operation and maintenance of wastewater systems, including effluent reuse.

- **Juan Curley Project**
  The Navajo Nation (2004)
  Develop and implement a grazing management plan for a 270 acre Navajo allotment. The plan is to identify strategies to reduce stream bank and gully erosion.

- **Hell's Hole Spring Development Project**
  Apache-Sitgreaves National Forest (2003)
  Improve water quality, wetland function, and water capacity at the following springs: Yellow Bull, Upper Linden, Coyote, and Miner.

Water Protection Fund Projects – The following Water Protection Fund Projects have been awarded by the Arizona Department of Water Resources. Information about these funds or projects can be obtained from ADWR at: http://www.azwater.gov.

- **Murray Basin – Saffel Canyon Phase II Project**
  The Apache-Sitgreaves National Forest (2000)
  Restore stream channels to their natural form and function on two severely degraded tributaries to Nutrioso Creek. The Forest Service also realigned and regraded roads, obliterated some roads, and revegetated some disturbed sites.

- **Pueblo Colorado Wash Project**
  Hubbell Trading Post Natural Site (2000)
  Continue the riparian area restoration of Pueblo Colorado Wash. This project was first funded in 1997 and has been successful in reestablishing the natural sinuosity of the channel, function of the riparian area, and natural vegetative communities in the area.

- **Hubbell Trading Post Riparian Restoration using Treated Effluent Project**
  Hubbell Trading Post Natural Site (2000)
  In conjunction with the project above, develop a distributions system to use secondary treated effluent to irrigate four acres of flood plain while reestablishing native vegetation in this riparian area.

- **Lake Mary Watershed Streams Restoration Project**
  Northern Arizona University (2000)
  Reduce sedimentation in tributaries to both Upper and Lower Lake Mary. The project will modify stream channels, revegetate riparian areas, and where possible, relocate roads further from the tributaries.

- **Upper Fairchild Draw Riparian Restoration Project**
  Apache Sitgreaves National Forest (2000)

Build an 8-foot high fence to enclose grazing wildlife from a 14 acre wet meadow and plant willows within the enclosure. This work is to reduce detrimental grazing, improve riparian conditions in this headwater to Willow Creek, and therefore, reduce sediment loadings.

- **Round Valley Water Users Project**
  Town of Eagar and Round Valley Water Users Association Project (2000)
  Study water losses due to current irrigation delivery system and feasibility of a more efficient system. Reductions in water losses are expected to encourage riparian area growth and therefore water quality in the Little Colorado River.

- **Polacca Wash Grazing Management Project**
  The Hope Tribe (2000)
  Exclude livestock from riparian areas and revegetate using native plants along portions of Polacca Wash.

- **Wet Meadows – A Riparian Restoration Project**
  The National Wild Turkey Federation (2003)
  Fence off wildlife from five wet meadows in the Apache Sitgreaves National Forest.

- **Wilkins' Little Colorado River Riparian Enhancement Project**
  Ranchers (2003)
  In collaboration with Arizona Game and Fish Department, revegetate using native plants, stabilize ¾ mile of stream banks, and create better wildlife habitat along the Little Colorado River near Springerville.

- **Diamond X Ranch Riparian Enhancement Project**
  Diamond X Ranch (2004)
  Revegetate and improve riparian conditions along the Little Colorado River to reduce sediment loading.

- **EC Bar Ranch Well and Drinker Project**
  EC Bar Ranch (2004)
  Develop alternative water sources to minimize livestock and wildlife use of a fragile riparian area along Nutrioso Creek.

Other Water Quality Studies

- ***Bathymetric Study of Northern Arizona Lakes – Draft Final Report***
  Paul Gremillion and Cristina Piastrini, Northern Arizona University (2005)
  Bathymetric maps of the following lakes were created to support the development of Total maximum Daily Loads for mercury and other water quality studies: Ashurst Lake, Kinnikinick Lake, Long Lake, Lower Lake Mary, Upper Lake Mary, Soldier Lake, and Soldier Annex Lake. Along with the maps, tables of surface area and volume versus storage were developed for these seven lakes.

- ***Upper Little Colorado River Concept Plan – A Road Map and Resource Guide to Riparian Enhancement for Private Landowners***
  Tom Moody, Ruth Valencia, Kelly Wirtanen, and Mark Wirtanen, Northern Arizona University, College of Engineering and Technology, Dept of Civil and Environmental Engineering (2001)
  This report provides information to the riverside landowner for the management of their private lands. It describes fundamental characteristics of a stream and its riparian community and recommends specific practices to reduce bank erosion and channel incision, and improve riparian condition, fishery habitat, livestock watering, and water diversions. The plan also provides information about regulatory permits necessary to conduct projects in and along the riparian corridor and a set of potential funding sources for stream enhancement projects.

- ***Generalized Hydrogeology and Ground Water Budget for the C Aquifer, Little Colorado River Basin and Parts of the Verde and Salt River Basins, Arizona and New Mexico***
  Robert J. Hart, John J. Ward, Donald J. Bills, and Marilyn E. Flynn – U.S.G.S.(2002)

This report discusses the hydrogeology, structural controls, aquifers, ground water movement and development, interaction of ground water and surface water, and ground water budget components for the C aquifer. The C aquifer covers more than 27,000 square miles and is the most productive aquifer in the Little Colorado River Watershed. It has a direct hydraulic connection to the Little Colorado River in some places, especially at spring discharges in the lower 13 miles (just above the Colorado River confluence). Ground water pumpage from the C aquifer during 1995 was about 140,000 acre-feet. Discharge from the C aquifer is estimated to be 319,000 acre-feet/year, with downward leakage to limestones accounting for most of the total discharge.

- ***Ground Water, Surface Water, and Water Chemistry Data, Black Mesa Area, Northeastern Arizona 2000-2001, and Performance and Sensitivity of the 1988 USGS Numerical Model of the N Aquifer***
  Blakemore E. Thomas – U.S. Geological Survey, in cooperation with the Arizona Dept of Water Resources and Bureau of Indian Affairs (2002)
  The N aquifer is the major source of water in the 5,400 square mile Black Mesa area in northeastern Arizona. Since 1971, monitoring has been designed to determine the long term effects of ground water withdrawals from the N aquifer for industrial and municipal uses. During the past 10 years, total withdrawals increased at an average rate of about 3% per year. Water levels in 33 wells dropped an average of 17 feet during the past 35 years (ranging 169-foot drop to 10-foot increase). Long-term effects of pumping on surface waters could not be measured. No significant trend in the annual average discharges for Moenkopi Wash and Laguna Creek, while median winter flows for Dinnebito Wash and Polacca Wash have decreased during the last 6 years.

- ***Ground Water, Surface Water, and Water Chemistry Data, Black Mesa Area, Northeastern Arizona 2001-2002***
  Blakemore E. Thomas – U.S. Geological Survey, in cooperation with the Arizona Dept of Water Resources and Bureau of Indian Affairs (2002)
  This is a continuation of study above.

- ***Ground Water, Surface Water, and Water Chemistry Data, Black Mesa Area, Northeastern Arizona 2001-2002***
  Blakemore E. Thomas – U.S. Geological Survey, in cooperation with the Arizona Dept of Water Resources and Bureau of Indian Affairs (2003)
  This is a continuation of study above.

- ***Ground Water, Surface Water, and Water Chemistry Data, Black Mesa Area, Northeastern Arizona 2002-2003***
  Blakemore E. Thomas – U.S. Geological Survey, in cooperation with the Arizona Dept of Water Resources and Bureau of Indian Affairs (2004)
  This is a continuation of study above.

- ***Ground Water, Surface Water, and Water Chemistry Data, Black Mesa Area, Northeastern Arizona 2003-2004***
  Blakemore E. Thomas – U.S. Geological Survey, in cooperation with the Arizona Dept of Water Resources and Bureau of Indian Affairs (2005)
  This is a continuation of study above.

- ***Hydrology of the D Aquifer and Movement and Ages of Ground Water Determined from Geochemical and Isotopic Analyses, Black Mesa Area, Northeastern Arizona.***
  Margot Truini and Steve A. Longsworth, U.S. Geological Survey, in cooperation with the Bureau of Indian Affairs (2003)
  Water samples from the D aquifer contain higher concentrations of dissolved solids than samples from the N aquifer; therefore, the Navajo Nation and the Hopi Tribe in Black Mesa are concerned about leakage from the overlying D aquifer into the N aquifer which is their primary source of potable water. The study found that leakage is most likely to occur in the southern part of Black Mesa.

- ***Water Quality Data form Navajo National Monument, Northeastern Arizona 2001-2002***
  Blakemore E. Thomas – U.S.G.S., in cooperation with the National Park Service (2003)
  Water samples were collected from two springs and one well near Betatakin ruin, one spring near Keet Seel Ruin, and one spring and one stream near Inscription House Ruin in 2001 and 2002. Water from all sites is from the N aquifer.

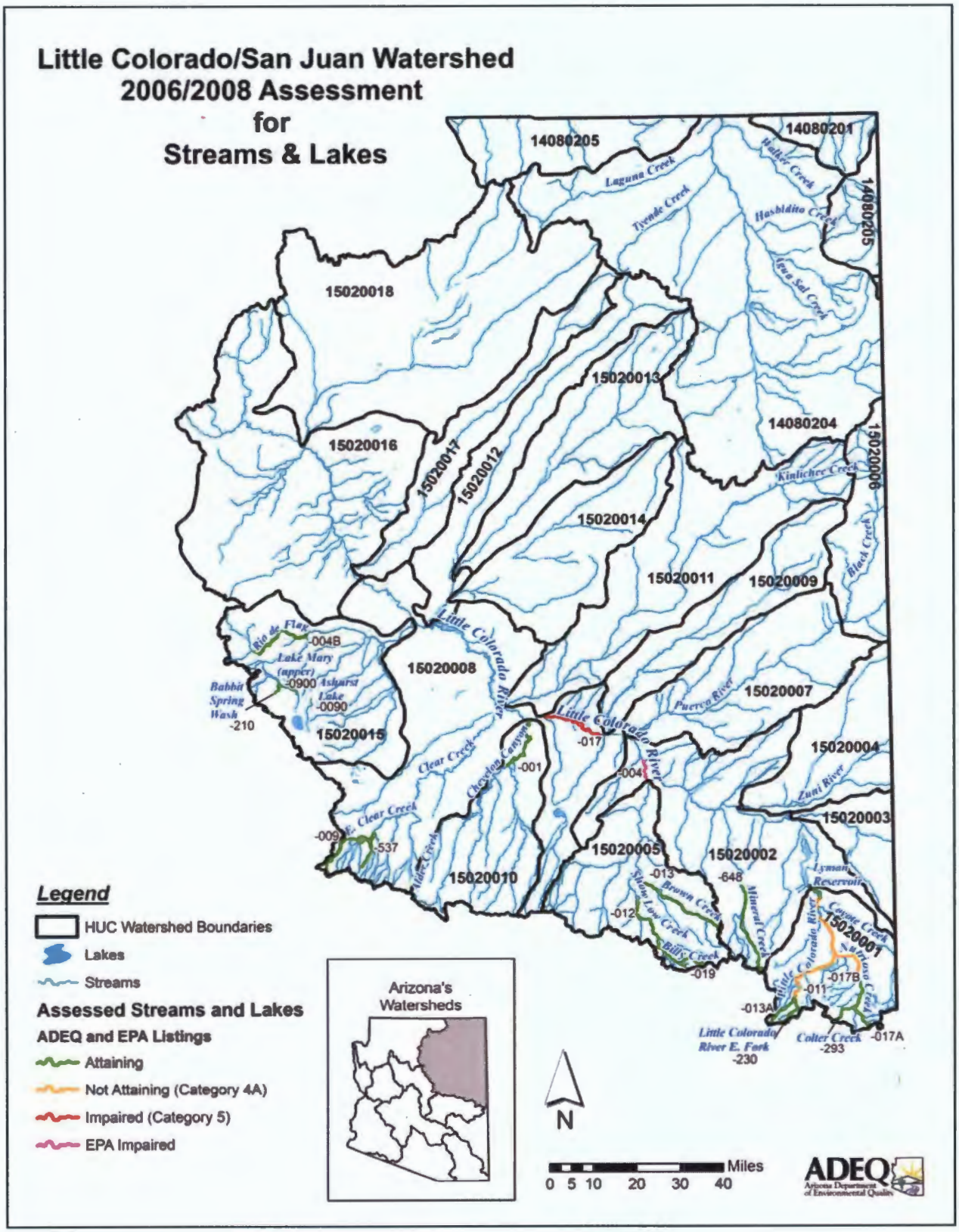
- ***Water Quality Data for Walnut Canyon and Wupatki National Monuments, Arizona 2001-02***
  Blakemore E. Thomas, U.S. Geological Survey in cooperation with the National Park Service (2003)
  Water quality data were collected from Cherry Canyon seep in Walnut Canyon, the Walnut Canyon headquarters well, Heiser Spring in Wupatki, and from the Little Colorado River at the edge of Wupatki to provide baseline water quality information.

Assessments

The Little Colorado River Watershed can be separated into the following drainage areas (subwatersheds):

14080105	La Plata River Drainage Area (Tribal Land – Not assessed)
14080106	Charco River Drainage Area (Tribal Land – Not assessed)
14080201	Cottonwood Creek Drainage Area (Tribal Land – Not assessed)
14080204	Chinle Wash Drainage Area (Tribal Land – Not assessed)
14080205	Oljeto Wash Drainage Area (Tribal Land – Not assessed)
15020001	Little Colorado River Headwaters Drainage Area
15020002	Upper Little Colorado River Drainage Area
15020003	Carrizo Wash Drainage Area
15020004	Zuni River Drainage Area
15020005	Silver Creek Drainage Area
15020006	Upper Puerco River Drainage Area (Tribal Land – Not assessed)
15020007	Lower Puerco River Drainage Area
15020008	Middle Little Colorado River Drainage Area
15020009	Wide Ruin Wash Drainage Area
15020010	Chevelon Canyon Drainage Area
15020011	Puerco Colorado Wash Drainage Area
15020012	Oraibi Wash Drainage Area (Tribal Land – Not assessed)
15020013	Polacca Wash Drainage Area (Tribal Land – Not assessed)
15020014	Jadito Wash Drainage Area (Tribal Land – Not assessed)
15020015	Canyon Diablo Drainage Area
15020016	Lower Little Colorado River Drainage Area
15020017	Dinnebito Wash Drainage Area (Tribal Land – Not assessed)
15020018	Moenkopi Wash Drainage Area (Tribal Land – Not assessed)

These drainage areas and the surface waters assessed as "attaining" or "impaired" are illustrated on the following watershed map. Methods used to complete these assessments are described in the "Surface Water Assessment Methods and Technical Support" document (2006).


Little Colorado/San Juan Watershed
2006/2008 Assessment
for
Streams & Lakes
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Laguna Creek
Tyende Creek
Hashbito Creek
Kinlichee Creek
Black Creek
Little Colorado River
Puerco River
Zuni River
Clear Creek
Chevelon Canyon
Silver Creek
Show Low Creek
Brown Creek
Billy Creek
Mineral Creek
Lyman Reservoir
Coyote Creek
Nutrioso Creek
Colter Creek
Little Colorado River E. Fork
Big M Flat
Lake Mary (upper)
Ashurst Lake
Babbit Spring Wash
-0048
-0900
-0090
-210
-009
-537
-001
-017
-004
-013
-012
-019
-648
-017B
-011
-013A
-017A
-293
-230
Legend
HUC Watershed Boundaries
Lakes
Streams
Assessed Streams and Lakes
ADEQ and EPA Listings
Attaining
Not Attaining (Category 4A)
Impaired (Category 5)
EPA Impaired
Arizona's Watersheds
N
Miles
0 5 10 20 30 40
ADEQ
Arizona Department of Environmental Quality

ASHURST LAKE	USE SUPPORT	OVERALL ASSESSMENT	
15020015 -- 0090 200 Acres	A&Wc – Inconclusive FBC – Attaining FC – Attaining AgI -- Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 10/16/2000 – 04/13/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam LCASH - A 100973	ADEQ Ambient	4-5 total and 0-2 dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, nickel, selenium, silver, thallium, and zinc 7 total and 4 dissolved: Mercury	5-8 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	3 *E. coli* bacteria 7 Fluoride 7 Total dissolved solids 5 Turbidity
Mid Lake LCASH – B 101294	ADEQ Ambient			
Boat Ramp LCASH – BR 101327	ADEQ Ambient (bacteria only)			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	09/09/2004 – 6.1 mg/L	Inconclusive – Low dissolved oxygen in 1 of 7 sampling events (1 of 9 samples) (binomial).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen	Insufficient dissolved metals (cadmium, copper and zinc) to assess A&Wc.		The lab detection limits for dissolved cadmium, copper, lead, mercury, and silver and total selenium were higher than the chronic A&W criteria for at least one sample.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional dissolved oxygen due to the exceedance. Note that the old turbidity standard (10 NTU) was exceeded in 5 of 5 samples. Turbidity and low dissolved oxygen may be symptoms of excess nutrient loadings. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect sufficient core parameters to represent at least 3 seasons. Use lower lab detection limits for dissolved metals and selenium.	

BABBIT SPRING WASH From headwaters to Upper Lake Mary 15020015 -- 210 2.3 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 09/10/2003 – 04/07/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Upper Lake Mary LCBBS000.02 102344	ADEQ TMDL	4 total and 4 dissolved metals: Mercury 2 total and 0-2 dissolved metals: Antimony, arsenic, barium, beryllium, boron cadmium, chromium, copper, lead, manganese, nickel, selenium, silver, thallium, and zinc.	2 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen. 3-4: Dissolved oxygen, pH	4 Fluoride 3 Total dissolved solids 3 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Mercury (dissolved)	0.01 µg/L A&Wc chronic	09/10/2003 – 0.013 µg/L	Inconclusive – Only 1 exceedance during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Mercury	Insufficient dissolved metals (cadmium, copper, and zinc) and *E. coli* bacteria samples to assess A&W and FBC.	Insufficient sampling events	Lab detection limits for dissolved cadmium, copper, lead, and silver were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Mercury Priority –Collect mercury samples due to the exceedance. Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for dissolved metals.	

BARBERSHOP CANYON CREEK From headwaters to East Clear Creek 15020008 - 537 10.2 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Attaining FBC – Attaining FC – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 12/20/2000 – 07/31/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Merritt Draw LCBRB006.74 100410	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 4 total metals only: Boron, manganese, and selenium	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, and pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	06/26/2001 – 6.5 mg/L 07/31/2001 – 6.6 mg/L	Attaining – Low dissolved oxygen due to low flow and ground water upwelling. Flow 0.01 cfs. Low nutrients (nitrogen 0.1-0.3 mg/L, phosphorus 0.01 mg/L)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Use lower lab detection limits for selenium and dissolved mercury.	

BEAR CANYON LAKE 15020008 -- 0130 55 Acres	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A D E Q	A&Wc – Inconclusive FBC – Inconclusive FC – Attaining AgI – Attaining AgL – Inconclusive	Category 2 Attaining some uses		
	E P A	A&Wc – Impaired FBC – Impaired AgL – Impaired	Category 5 Impaired	Low pH	EPA listed due to low pH in 2004.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 06/20/2000 – 06/19/2001 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Dam LCBCL - A 100969	ADEQ Ambient	3-5 total and 0-1 dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc	4-6 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	3 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Turbidity
At boat ramp LCBCL – BR 101326	ADEQ Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	10/18/2000 – 6.6 mg/L	Inconclusive – 1 in 4 samples below criterion. (Binomial)
pH	6.5-9.0 SU A&Wc, FBC, AgL	10/18/2000 – 5.8 SU 05/16/2001 – 6.2 SU 06/13/2001 – 6.3 SU 09/18/2001 – 5.9 SU	Inconclusive – Low pH recorded near the bottom of the lake on each of 4 visits. All low pH values occurred at between 7 to 11.8 meters deep.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen	Missing dissolved metals (copper, cadmium, and zinc) to assess A&Wc.		Lab detection limits for dissolved metals (cadmium, copper, lead, mercury, and selenium) and total selenium were higher than applicable criteria.
DISCUSSION OF LOW PH		Evidence of potential impairment by low pH: 1. No data since the last assessment, and 2. All low pH values occurred between 7 to 12 meters deep, which may be due to natural conditions near the lake bottom.	
MONITORING RECOMMENDATIONS		High Priority – Collect pH measurements to support TMDL development. Collect additional dissolved oxygen samples due to the exceedances. Collect sufficient core parameters to represent at least 3 seasons. Use lower lab detection limits for dissolved metals and selenium.	

BILLY CREEK From headwaters to Show Low Creek 15020005 -- 019 18.5 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Attaining FBC – Inconclusive FC – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/06/2000 – 09/11/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Pinetop, AZ LCBIL005.75 100946	ADEQ Ambient	8 total and dissolved metals: Antimony, arsenic, barium, beryllium, boron, chromium, mercury nickel, silver, thallium, and zinc 8 total metals only: Cadmium, copper, lead, selenium, and silver (4 samples at each of 2 sites)	8 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	8 *E. coli* bacteria 8 Fluoride 8 Total dissolved solids 8 Turbidity
Above Porter Creek LCBIL000.01 100947	ADEQ Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	06/26/2001 – 5.8 (both sites)	Attaining – Low dissolved oxygen due to natural conditions of low flow and ground water upwelling.
E. coli bacteria	235 CFU/100 ml FBC	11/06/2000 – 420 CFU/100 ml	Inconclusive – Only 1 exceedance in the last 3 years of monitoring (4 events)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
E. coli bacteria	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional *E. coli* bacteria samples due to the exceedance. Use lower lab detection limits for selenium and dissolved mercury.	

BLACK CANYON LAKE 15020010 -- 0180 35 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Attaining FC – Attaining DWS – Inconclusive AgI – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 10/04/2002 – 11/02/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Dam LCBLC - A 100014	AGFD Ambient	1-2 total metals only: Arsenic, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, and zinc	7-8 samples total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 Fluoride 8 Total dissolved solids 6 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	10/04/2002 – 3.3 mg/L 11/13/2002 – 6.1 mg/L 10/20/2003 – 5.7 mg/L	Inconclusive – 3 in 8 samples below criterion. (Binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen	Insufficient samples to assess any designated use.		Lab detection limits for dissolved metals (cadmium, copper, lead, mercury) and selenium were higher than applicable criteria.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional dissolved oxygen samples due to the exceedances. Note that the old turbidity criterion (10 NTU) was exceeded in 3 of 6 samples. Turbidity and low dissolved oxygen may be symptoms of excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect sufficient core parameters to represent at least 3 seasons. Use lower lab detection limits for dissolved metals and selenium	

BLUE RIDGE RESERVOIR 15020008 -- 0200 290 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Attaining AgI – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 10/17/2000 – 07/13/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Dam LCBRR - A 100974	ADEQ Ambient	4-5 total and 0-2 dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc	4-5 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	1 *E. coli* bacteria 5 Fluoride 4 Total dissolved solids 4 Turbidity
North inlet LCBRR– C 101293	ADEQ Ambient			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient dissolved metals (copper, cadmium, and zinc) and *E. coli* bacteria to assess A&Wc and FBC.		Lab detection limits for dissolved metals (cadmium, copper, lead, mercury, and silver) were higher than applicable criteria.
MONITORING RECOMMENDATIONS		Low Priority –Collect sufficient core parameters to represent at least 3 seasons. Use lower lab detection limits for dissolved metals.	

BROWN CREEK	USE SUPPORT	OVERALL ASSESSMENT	
From headwaters to Silver Creek 15020005-016 14.5 Miles	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 06/20/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Brown Spring (Below cattle exclosure) LCBRO018.96 101242	ADEQ Special investigation	2 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 2 total metals only: Boron, manganese, and selenium (2 sites – only one date)	2 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	2 *E. coli* bacteria 2 Fluoride 2 Total dissolved solids 2 Turbidity
Outside cattle exclosure LCBRO018.13 101241	ADEQ Special investigation			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	06/20/2001 – 6.0 mg/L	Attaining – Low dissolved oxygen due to low flow conditions and ground water upwelling. Flow was 1.5 cfs. Low nutrients (0.09 nitrogen and 0.07 mg/L phosphorus)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events.	Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Collect sufficient core parameters to represent at least 3 seasons. Use lower lab detection limits for selenium and dissolved mercury.	

BUNCH RESERVOIR 15020001 -- 0230 65 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 04/17/2001 – 10/17/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid lake LCBUN - B 102537	AGFD Ambient	3 total metals only: Copper, manganese, and zinc	3 sample: Ammonia, total nitrogen, total phosphorus, total Kjeldahl nitrogen, nitrate/nitrite, dissolved oxygen, pH	3 Total dissolved solids

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	07/25/2001 – 6.1 mg/L 10/17/2001 – 5.6 mg/L	Inconclusive – 2 exceedances in 3 samples (Requires a minimum of 5 exceedances and 20 samples to assess as impaired.)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen	Missing dissolved metals (copper, cadmium, and zinc), mercury, *E. coli* bacteria, boron, manganese, and lead to assess designated uses.		
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional dissolved oxygen samples due to the exceedances. Collect sufficient core parameters to represent at least 3 seasons. Low dissolved oxygen may indicate excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring.	

CARNERO LAKE 15020001 -- 0260 65 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Attaining AgL – Inconclusive	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIODS: 04/25/2001-10/16/2001; 08/17/2004 – 05/25/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Deepest part of lake LCCAR - A 101839	ADEQ Ambient	3 total and 0-2 dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc	5-6 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	3 Fluoride 5 Total dissolved solids

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	07/24/2001 – 3.8 mg/L	Inconclusive – Low dissolved oxygen in 1 of 5 sampling events.
pH	<9.0 SU A&Wc, FBC, AgL	07/24/2001 – 9.9 SU 10/16/2001 – 9.7 SU	Inconclusive – High pH in 2 of 6 sampling events.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen and pH	Insufficient *E. coli* bacteria and dissolved metals (cadmium, copper and zinc) to assess A&W and FBC.		The lab detection limits for dissolved metals (cadmium, copper, lead) and total selenium were higher than the chronic A&W criteria for at least 1 sample.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional dissolved oxygen and pH due to exceedances. Low dissolved oxygen and high pH may be symptoms of excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect sufficient core parameters to represent at least 3 seasons. Use lower lab detection limits for dissolved metals and selenium.	

CHEVELON CANYON CREEK From Black Canyon Creek to Little Colorado River 15020010 -- 001 19.3 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Attaining FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 12/19/2000 – 07/30/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below diversion dam near Winslow, AZ LCCHC000.91 100341	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 4 total metals only: Boron, manganese, and selenium	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, and pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Use lower lab detection limits for selenium and dissolved mercury.	

CHOLLA LAKE 15020008 -- 0320 130 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 06/18/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid Lake LCCHO - B 102541	AGFD Ambient	2 total metals only: Arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, nickel, silver, and zinc	2 sample: Ammonia, total nitrogen, nitrite/nitrate, total Kjeldahl nitrogen, dissolved oxygen, pH	2 Fluoride 2 Total dissolved solids
Warmwater inlet LCCHO – IN 102540	AGFD Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient dissolved metals (copper, cadmium, and zinc) and *E. coli* bacteria, and mercury to assess A&Ww, FBC, and FC	Insufficient sampling events	Lab detection limits for selenium and dissolved mercury were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Collect sufficient core parameters to represent at least 3 seasons. Use lower lab detection limits for dissolved metals and selenium	

COLTER CREEK	USE SUPPORT	OVERALL ASSESSMENT	
From headwaters to Nutrioso Creek 15020001-293 8.6 Miles	A&Wc – Attaining FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 10/19/2000 – 08/30/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Rogers Reservoir LCCOL005.53 102020	ADEQ TMDL (turbidity only)	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 4 total metals only: Boron and manganese	3-4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 1 Suspended sediment concentration 6 Turbidity
Near Nutrioso, AZ LCCOL003.03 100935	ADEQ Ambient			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters.		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Use lower lab detection limits for dissolved metals.	

EAST CLEAR CREEK From headwaters to Yeager Creek 15020008 -- 009 38.0 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Attaining FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 12/20/2000 – 07/31/2001 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Yeager Canyon LCECL017.75 100537	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 4 total metals only: Boron, manganese, and selenium	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, and pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	06/26/2001 – 5.4 mg/L 07/31/2001 – 6.1 mg/L	Attaining – Low dissolved oxygen due to low flow and ground water upwelling. (Flow 0.7 and 0.8 cfs and low nutrients concentrations.)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Use lower lab detection limits for selenium and dissolved mercury.	

EAST FORK LITTLE COLORADO CREEK From headwaters to Hall Creek 15020001-230 10.6 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Attaining FBC – Attaining FC – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/08/2000 – 09/12/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Montlure Church Camp near Greer LCELR000.99 100948	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 4 total metals only: Boron. Manganese, and selenium	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, and pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Use lower lab detection limits for selenium and dissolved mercury.	

FISH CREEK From headwaters to Little Colorado River 15020001 -- 211 9.0 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 06/18/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Forest Road #118 LCFIS003.86 101244	ADEQ Ambient	1 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 1 total metals only: Boron, manganese	1 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	1 *E. coli* bacteria 1 Fluoride 1 Total dissolved solids 5 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Mercury (dissolved)	0.01 µg/L – A&Wc 0.6 µg/L – FC	06/18/2001 – 0.8 µg/L	Inconclusive – Only sample collected exceeded both criteria during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Mercury	Insufficient core parameters	Insufficient sampling events.	Lab detection limit for selenium was higher than A&W chronic criterion.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional mercury samples due to the exceedance. Collect sufficient core parameters to represent at least 3 seasons. Use lower lab detection limits for selenium.	

FOOLS HOLLOW LAKE 15020005-0530 150 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 08/08/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam LCFOO - A 100023	ADEQ Ambient	1 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 1 total metals only: Boron, manganese, and selenium	1 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	1 *E. coli* bacteria 1 Fluoride 1 Total dissolved solids 1 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	08/08/2003 – 6.5- 6.7	Inconclusive – Low dissolved oxygen on only 1 sampling date. (Binomial)
Selenium	2.0 µg/L A&Wc chronic	08/08/2003 – 10 µg/L	Inconclusive – Only 1 exceedance in the last 3 years of monitoring.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen and selenium	Insufficient core parameters	Insufficient sampling events.	Lab detection limits for selenium and dissolved mercury were higher than the A&Wc chronic criterion.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional dissolved oxygen and selenium due to exceedances. Collect sufficient core parameters to represent at least 3 seasons. Use a lower lab detection limit for selenium and dissolved mercury.	

HALL CREEK From headwaters to Little Colorado River 15020001 -- 012 14.3 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 06/20/2000 – 06/19/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Highway 273 LCHAL008.83 101263	ADEQ Ambient	1 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 1 total metals only: Boron, manganese, and selenium	1 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	1 *E. coli* bacteria 1 Fluoride 1 Total dissolved solids 5 Turbidity
Highway 373 bridge LCHAL000.85 102274	ADEQ TMDL			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	06/19/2001 – 6.5 mg/L	Attaining – Low dissolved oxygen due to low flow conditions and ground water upwelling. Flow was 0.1 cfs.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events.	Lab detection limits for selenium and dissolved mercury were higher than the A&Wc chronic criterion.
MONITORING RECOMMENDATIONS		Low Priority – Collect sufficient core parameters to represent at least 3 seasons. Use lower lab detection limits for selenium and dissolved mercury.	

KINNIKINICK LAKE 15020015 -- 0730 115 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Attaining FC – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 10/16/2000 – 04/13/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam LCKIN - A 100971	ADEQ Ambient	6-9 total and 0-1 dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, nickel, selenium, silver, thallium, and zinc 9 total and 4 dissolved: Mercury	6-10 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	3 *E. coli* bacteria 8 Fluoride 10 Total dissolved solids 8 Turbidity
Mid Lake LCKIN – B 100972	ADEQ Ambient			
Boat Ramp LCKIN – BR 101325	ADEQ Ambient (bacteria only)			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	09/09/2004 – 6.3 mg/L	Attaining– Low dissolved oxygen in 1 of 10 sampling events (1 of 12 samples).
Lead (dissolved)	1.1 µg/L at 47 mg/L hardness A&Wc chronic	06/14/2001 – 2 µg/L	Inconclusive. Only marginally over the criterion. Only 1 sample analyzed for dissolved lead.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Lead	Insufficient dissolved metals (cadmium, copper and zinc) to assess A&Wc.		The lab detection limits (for at least 1 sample) for dissolved cadmium, copper, mercury, and silver were higher than the chronic A&W criteria.
MONITORING RECOMMENDATIONS		Low Priority – Collect additional lead samples due to the exceedance. Collect sufficient core parameters to represent at least 3 seasons. Use lower lab detection limits for dissolved metals. Note that the old turbidity criterion (10 NTU) was exceeded in all 8 sampling events where turbidity was analyzed. Low dissolved oxygen and turbidity may indicate excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring.	

LAKE MARY (LOWER) 15020015 -- 0890 765 Acres	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A D E Q	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgL – Inconclusive	Category 3 Inconclusive		
	E P A	FC – Impaired	Category 5 Impaired	Mercury in fish tissue	EPA listed mercury in 2002. Regional mercury TMDL to be completed in 2009.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 05/02/2002 – 04/12/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam LCMAL - A 102253	ADEQ TMDL	6 total and 6 dissolved metals: Mercury 2 total and 0-2 dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, nickel, selenium, silver, thallium, and zinc	2 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	5 Fluoride 6 Total dissolved solids 1 Turbidity
Mid Lake LCMAL – B 103360	ADEQ TMDL			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	05/14/2003 – 5.2	Inconclusive – Low dissolved oxygen in 1 of 6 sampling events (binomial).
pH	<9.0 SU A&Wc, FBC, AgL	09/08/2004 – 9.4 SU 08/13/2003 – 10.2 SU	Inconclusive – 2 exceedances in 6 sampling events (7 samples). A minimum of 5 exceedances and 20 samples for impairment decision (binomial).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen and pH	Insufficient dissolved metals (cadmium, copper and zinc), *E. coli* bacteria, copper and lead to assess A&Wc, FBC, and AgL.		The lab detection limits for dissolved metals (cadmium, copper and lead) were higher than the chronic A&W criteria for at least 1 sample.
DISCUSSION OF MERCURY IMPAIRMENT		Evidence of potential mercury impairment: 1. Mercury fish consumption advisory issued in 2002 remains in effect; and 2. A TMDL should be completed and approved in 2009.	
MONITORING RECOMMENDATIONS		High Priority – Collect mercury samples to support completion of the mercury TMDL. Collect additional dissolved oxygen and pH samples due to the exceedances. Low dissolved oxygen and high pH may indicate an excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect sufficient core parameters to represent at least 3 seasons. Use lower lab detection limits for dissolved metals.	

LAKE MARY (UPPER) 15020015 -- 0900 860 Acres	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Wc – Inconclusive FBC – Inconclusive FC – Attaining DWS – Inconclusive AgL – Attaining	Category 2 Attaining Some uses		
	EPA	FC – Impaired	Category 5 Impaired	Mercury in fish tissue	EPA listed mercury in 2002. Regional mercury TMDL to be completed in 2009.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 05/02/2002 – 04/12/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam LCMAU - A 100029	ADEQ TMDL	17 total and 17 dissolved: Mercury 9 total and 3-9 dissolved metals: Antimony, arsenic, barium, beryllium, boron, chromium, lead, manganese, nickel, selenium, thallium, and zinc 9 total and 0-2 dissolved: Cadmium, copper, and silver	9-17 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	2 *E. coli* bacteria 12 Fluoride 17 Total dissolved solids 11 Turbidity
Mid lake LCMAU – B 101342	ADEQ TMDL			
Near dam LCMAU – A1 101312	ADEQ TMDL			
Near dam also LCMAU – A2 101314	ADEQ TMDL			
Between Newman and Railroad canyons LCMAU – C 102252	ADEQ TMDL			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Copper (dissolved)	6.5 µg/L at 46 mg/L hardness A&Wc acute	05/02/2002 – 10 µg/L	Inconclusive – Only 1 exceedance in the last 3 years of monitoring. (See note below concerning lab detection limits)
Dissolved oxygen	7.0 mg/L A&Wc	08/13/2003 – 5.9 mg/L 09/08/2004 – 6.1 mg/L	Inconclusive – Low dissolved oxygen in 2 of 6 sampling events.
Mercury (dissolved)	0.01 µg/L A&Ww chronic	09/08/2004 – 0.0185 µg/L	Inconclusive – Only 1 exceedance during the assessment period.
Nickel (dissolved)	18.8 µg/L at 30 mg/L hardness A&Wc chronic	03/24/2004 – 20 µg/L	Inconclusive – Only 1 exceedance in the last 3 years of monitoring.
Nickel	140 µg/L DWS	03/24/2004 – 790 µg/L	Inconclusive – Only 1 exceedance in 3 sampling events.
Zinc (dissolved)	50.5 µg/L at 37 mg/L hardness	08/13/2003 – 80 µg/L	Inconclusive – Only 1 exceedance during the last 3 years of monitoring.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	**MISSING CORE PARAMETERS**	**MISSING SEASONAL DISTRIBUTION**	**DETECTION LIMITS NOT LOW ENOUGH**
Copper, dissolved oxygen, nickel, zinc	Insufficient dissolved metals (cadmium, copper, and zinc), and *E. coli* bacteria to assess A&Wc and FBC.		The lab detection limits (for at least 1 sample) for dissolved metals (cadmium, copper, lead, mercury, and silver) were higher than the chronic A&W criteria.
DISCUSSION OF MERCURY IMPAIRMENT		Evidence of potential mercury impairment: 1. Mercury fish consumption advisory issued in 2002 remains in effect; and 2. A TMDL should be completed and approved in 2009.	
MONITORING RECOMMENDATIONS		High Priority – Collect mercury samples to support completion of the mercury TMDL. Collect additional copper, dissolved oxygen, nickel and zinc samples due to the exceedances. Low dissolved oxygen may indicate excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect sufficient core parameters to represent at least 3 seasons. Use lower lab detection limits for dissolved metals.	

LEE VALLEY CREEK	USE SUPPORT	OVERALL ASSESSMENT	
From headwaters to Lee Valley Reservoir 15020001-232A 1.6 Miles Unique Water	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 06/19/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Lee Valley Reservoir LCLVL001.32 101243	ADEQ Ambient	1 total and dissolved metals: Antimony, arsenic, barium, beryllium, boron, chromium, mercury, nickel, selenium, silver, thallium, and zinc 1 total metals only: Cadmium, copper, lead, and silver	1 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	1 *E. coli* bacteria 1 Fluoride 1 Total dissolved solids 1 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events	Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for selenium and dissolved mercury.	

LEE VALLEY RESERVOIR 15020001-0770 35 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Attaining AgI -- Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/14/2001 – 06/12/2002 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam LCLEE - A 101356	ADEQ Ambient	3 total and dissolved metals: Antimony, arsenic, barium, beryllium, boron, chromium, mercury, nickel, selenium, silver, thallium, and zinc 3 total metals only: Cadmium, copper, lead, and silver	3 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	3 Fluoride 3 Total dissolved solids 3 Turbidity
Shoreline LCLEE – SH 101357	ADEQ Ambient (*E. coli* only)			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Nitrogen	1.10 mg/L A&Wc and FBC	04/02/2002 – 1.58 mg/L 06/12/2002 – 1.85 mg/L	Inconclusive – Exceeded criteria in 2 of 3 samples. (Requires a minimum of 5 exceedances and 20 samples to assess as impaired.)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Nitrogen	Insufficient dissolved metals (cadmium, copper) and *E. coli* bacteria to assess A&W and FBC.		Lab detection limits for dissolved metals (cadmium, copper, mercury, and silver) were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional nitrogen samples due to the exceedances. Elevated nitrogen may indicate excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for dissolved metals.	

LITTLE COLORADO RIVER From West Fork Little Colorado River to Water Canyon 15020001 -- 011 19.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 4A Not attaining	Suspended sediment (turbidity)	A turbidity TMDL was approved in 2002. Implementing strategies to reduce sediment loading. (See discussion in reach 15020001-009)

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 06/20/2000 – 09/12/2001 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
County Road 4036 (X Diamond Ranch) LCLCR352.03 102279	ADEQ TMDL	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 4 total and 0-2 dissolved: Boron, manganese, and selenium	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen 19 Dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 37 Turbidity
County Road pull out LCLCR350.73 102283	Volunteers 319 Project and ADEQ TMDL			
Below South Fork LCR LCLCR350.32 100581	ADEQ Ambient			
Highway 273 bridge LCLCR346.01 102281	ADEQ TMDL			
Schoolhouse Road LCLCR344.58 102284	ADEQ TMDL			
At Water Canyon bridge LCLCR343.72 102282	ADEQ TMDL			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	6/27/2001 – 6.5 mg/L	Attaining – Only 1 exceedance in 19 samples (binomial).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority – Continue effectiveness monitoring for TMDL implementation strategies. 13 of 37 turbidity samples exceeded the old criteria (10 NTU). Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted.	

LITTLE COLORADO RIVER From Water Canyon to Nutrioso Creek 15020001 -- 010 3.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 4A Not attaining	Suspended sediment (turbidity)	A turbidity TMDL was approved in 2002. Implementing strategies to reduce loading. (See discussion in reach 15020001-009)

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 06/21/2000 – 12/02/2002		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Springerville – 4th Street LCLCR343.58 102286	ADEQ TMDL	None	30 Dissolved oxygen, 30 pH	30 Turbidity
Springerville – River Street LCLCR343.18 102292	ADEQ TMDL			
Airport road weir LCLCR341.63 102285	ADEQ TMDL			
Above Highway 60 bridge LCLCR340.65 100333	Volunteers 319 Project ADEQ TMDL			
Diversion near Springerville LCLCR339.28 102291	ADEQ TMDL			
At golf course LCLCR302.98 103274	Volunteers 319 Project			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	10/16/2001 – 6.4 mg/L	Attaining – Only 1 exceedance in 30 samples

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Missing core parameters		
MONITORING RECOMMENDATIONS		Medium Priority – Continue effectiveness monitoring for TMDL implementation strategies. Note that 14 of 30 turbidity samples exceeded the old criteria (10 NTU). Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted	

LITTLE COLORADO RIVER From Nutrioso Creek to Carnero Creek 15020001-- 009 12.1 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 4A Not attaining (Impaired)	Suspended sediment (turbidity)	A turbidity TMDL was approved in 2002. Implementing strategies to reduce loading. See discussion below.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 03/29/2000 – 06/09/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Springerville WWTP LCLCR340.02 100331	ADEQ and USGS Ambient	7-24 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 24 total and 0-1 dissolved: Boron, manganese	23-24 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	21 *E. coli* bacteria 22 Fluoride 21 Total dissolved solids 12 Suspended sediment concentration 42 Turbidity
Casa Malpais across from Becker Lake LCLCR339.28 102287	ADEQ TMDL			
At Weinema Bridge LCLCR336.76 102567	AGFD Ambient			
At Weinema Wildlife area on Hooper Road LCLCR336.72 102290	ADEQ TMDL			
Canyon off Highway 180 LCLCR334.96 102324	ADEQ TMDL			
Road crossing on H-180 LCLCR331.83 102288	ADEQ TMDL			
At Carnero Creek LCLCR328.04 102289	ADEQ TMDL			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
E. coli bacteria	235 CFU/100 ml FBC	08/15/2000 – 260 CFU/100 ml	Attaining – No exceedances in the last 3 years of monitoring. (Note, only marginally over criteria and not above the screening value.)
pH	<9.0 SU A&Wc, FBC, AgI, AgL	06/10/2003 – 9.4 SU	Attaining – Only 1 exceedance in 24 sampling events. (Binomial)
Suspended sediment concentration (SSC)	Geometric mean 80 mg/L A&Wc	04/02/2003 – 111 mg/L#	Attaining – #This exceedance could not be included in the geometric mean calculation because it occurred during a high flow event. Geometric mean was not exceeded. However, the old turbidity standard (10 NTU was exceeded in 35 of the 42 measurements taken.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limit for selenium was higher than A&Wc chronic criteria.
DISCUSSION OF TURBIDITY IMPAIRMENT		Critical conditions of flow were defined in the TMDL. To date, there is insufficient data collected during the critical elevated flow conditions to determine whether the stream is meeting standards. This reach was originally listed as impaired by turbidity; however, the turbidity standard was replaced by a suspended sediment concentration (SSC) criterion in 2002. As noted above, the SSC standard has not been exceeded in this reach; however, the old turbidity criterion of 10 NTU was exceeded in 35 of 42 field samples. Several proposals in the 2006 Triennial Review of surface water quality standards would also be useful in studying impacts due to sediment and determining impairment, such as: A. Biocriteria implementation procedures, B. Narrative bottom deposits implementation procedures, C. Revision of the SSC criterion. Once adopted, these procedures may be applied to this reach.	
MONITORING RECOMMENDATIONS		Medium Priority –Continue effectiveness monitoring for TMDL implementation strategies. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Use lower lab detection limits for selenium.	

LITTLE COLORADO RIVER From unnamed reach (15020001-021) to Lyman Lake 15020001-- 005 3.4 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Inconclusive FC – Attaining AgI – Attaining AgL – Attaining	Category 4A Not attaining	Suspended sediment	TMDL approved in 2002 for two reaches upstream. Placed on Category 4 in 2004 due to exceedances. (See discussion in reach 15020001-009)

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/14/2000 – 08/07/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Lyman Lake USGS #09384000 LCLCR323.60 101174	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 4 total metals only: Boron, manganese, and selenium	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 3 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
E. coli bacteria	235 CFU/100 ml	08/07/2001 – 354 CFU/100 ml	Inconclusive – Only 1 exceedance in the last 3 years of monitoring.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
E. coli bacteria	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority – Continue effectiveness monitoring for TMDL implementation strategies. Collect suspended sediment concentration samples. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted Note that the old turbidity criterion (10 NTU) was exceeded in 3 of 4 samples (18, 24, and 481 NTU). Collect additional *E. coli* bacteria due to the exceedance. Use lower lab detection limits for selenium and dissolved mercury.	

LITTLE COLORADO RIVER From Silver Creek to Carr Wash 15020002- 004 6.1 Miles	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A D E Q	A&Wc – Impaired FBC – Impaired FC – Inconclusive DWS – Inconclusive AgI – Attaining AgL – Attaining	Category 5 Impaired	*E. coli* bacteria, suspended sediment concentration	Added *E. coli* bacteria in 2004. Adding suspended sediment concentration for 2006.
	E P A	FBC – Impaired	Category 5 Impaired	Suspended sediment	EPA listed sediment in 2004

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 03/27/2000 – 06/07/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Woodruff, AZ USGS #09394500 LCLCR226.31 100334	ADEQ and USGS Ambient	14-18 total and dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, zinc 6-8 total and dissolved metals: Barium, nickel, silver, thallium 18 total metals only: Boron, manganese, and selenium	17-18 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	16 *E. coli* bacteria 18 Fluoride 13 Total dissolved solids 9 Suspended sediment concentration 16 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Arsenic	50 µg/L DWS and FBC	08/14/2000 – 67 µg/L	Attaining – Only 1 exceedance in 18 samples. (Binomial)
Barium	2000 µg/L DWS	08/14/2000 – 7700 µg/L# 08/06/2001 – 3400 µg/L#	Inconclusive – 2 exceedances in 8 samples. (Binomial) #Exceedances occurred during monsoon flood events.
Beryllium	4 µg/L DWS	08/14/2000 – 43 µg/L# 08/06/2001 – 13 µg/L#	Inconclusive – 2 exceedances in 8 samples. (Binomial) #Exceedances occurred during monsoon flood events.
Chromium	100 µg/L DWS and FBC	08/14/2000 – 120 µg/L	Attaining – Only 1 exceedance in 17 samples. (Binomial)
Dissolved oxygen	7.0 mg/L A&Wc	08/06/2001 – 6.3 mg/L 08/07/2003 – 6.3 mg/L 08/12/2003 – 6.0 mg/L	Attaining – Only 3 of 17 samples did not meet standards. (Binomial)
E. coli bacteria	235 CFU/100 ml	08/14/2000 – 57000 CFU/100 ml 08/06/2001 – 1800 CFU/100 ml 08/07/2003 – 833 CFU/100 ml	Remains impaired –Only 1 of 7 samples exceeded the criterion in the last 3 years of monitoring (3 in the assessment period).
Lead	15 µg/L – FBC and DWS 100 µg/L – AgL	08/14/2000 – 290 µg/L 05/21/2001 – 19 µg/L 08/06/2001 – 110 µg/L 08/12/2003 – 16 µg/L	Inconclusive – 4 of 18 samples exceeded the 15 µg/L criterion. (Binomial requires a minimum of 5 exceedances and 20 samples.)
Manganese	980 µg/L DWS	08/14/2000 – 9800 µg/L 08/06/2001 – 3300 µg/L	Attaining – Only 2 of 18 samples exceeded criterion. (Binomial)
Mercury	0.6 µg/L FC	05/21/2001 – 0.61	Attaining – Only 1 exceedance in 18 samples. (Binomial) (Only slightly above the criterion)
Nickel	140 µg/L DWS	08/14/2000 – 210 µg/L	Inconclusive – Only 1 exceedance in 8 samples (Binomial)
Suspended sediment	Geometric mean 80 mg/L	10/01/2002 – 98 mg/L 04/01/2003 – 107 mg/L	Impaired – 5 of 9 samples exceeded criterion. No elevated flows (0.2 to 18 cfs). Geometric mean of 4

concentration (SSC)		08/07/2003 – 563 mg/L 09/24/2003 – 101 mg/L 07/07/2004 – 119 mg/L	samples exceeded 80 mg/L five times. Note that the old turbidity standard (10 NTU) was also exceeded in all 16 samples.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	**MISSING CORE PARAMETERS**	**MISSING SEASONAL DISTRIBUTION**	**DETECTION LIMITS NOT LOW ENOUGH**
Barium, beryllium, lead, nickel	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
DISCUSSION OF IMPAIRMENT DUE TO SUSPENDED SEDIMENT CONCENTRATION		EPA originally listed sediment in 2004. In the current assessment, ADEQ has sufficient evidence to also list this reach as impaired by suspended sediment based on 5 exceedances of geometric mean standard.	
MONITORING RECOMMENDATIONS		High Priority – Collect additional *E. coli* and sediment samples to support TMDL development. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Collect additional barium, beryllium, lead and nickel samples due to the exceedances. Use lower lab detection limits for selenium and dissolved mercury.	

LITTLE COLORADO RIVER From Porter Tank Draw to McDonalds Wash 15020008 -- 017 17.4 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Inconclusive FC – Inconclusive DWS – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 5 Impaired	Copper, silver and suspended sediment	Copper and silver on 303(d) List since 1992. Added suspended sediment in 2004.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 06/20/2000 – 09/23/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Joseph City, AZ USGS #09397300 LCLCR206.75 101480	USGS Ambient	None	None	30 Suspended sediment (7-day averages)

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Suspended sediment concentration (SSC)	Geometric mean 80 mg/L A&Wc	Too many to list out here.	Remains impaired –Exceeded during all 30 of 7-day aggregation periods. Concentrations ranged from 107-130,000 mg/L and the average concentration was 57,835 mg/L. Some measurements occurred during elevated flows, and would be excluded from the geometric mean calculation, but not all values.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Missing all core parameters needed to assess designated uses.		
MONITORING RECOMMENDATIONS		High Priority – Collect additional sediment, copper, and silver samples to support TMDL development. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted Collect core parameters to represent at least 3 seasons during the assessment period.	

LONG LAKE (LOWER) 15020008 -- 0820 320 Acres	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive		
	EPA	FC – Impaired	Category 5 Impaired	Mercury in fish tissue	EPA listed mercury in 2004 due to mercury fish consumption advisory. Regional mercury TMDL to be completed in 2009.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 10/17/2000 – 07/13/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Dam LCLLL - A 101715	ADEQ Ambient	8 total and 7 dissolved: Mercury 3-4 total and dissolved: Cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc 4 total and 0-2 dissolved: Antimony, arsenic, barium, beryllium, boron, manganese, selenium, silver, thallium	3-6 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	1 *E. coli* bacteria 5 Fluoride 6 Total dissolved solids 1 Turbidity
Shoreline LCLLL - SHORE 100999	ADEQ Ambient (algae only)			
North Cove LCLLL – NC 102760	AGFD Ambient			
South Cove LCLLL – SC 102555	AGFD Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
pH	<9.0 SU A&Wc FBC, AgI, AgL	08/07/2003 – 9.8 SU 07/03/2003 – 9.5 SU	Inconclusive – 2 of 8 samples exceeded the criterion. (Binomial method requires a minimum of 5 exceedances and 20 samples to assess as impaired.)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
pH	Missing *E. coli* bacteria to assess FBC.		Lab detection limits for dissolved metals (copper, lead, mercury, selenium, and silver) and total selenium were higher than applicable criteria for at least 1 sample.
DISCUSSION OF MERCURY IMPAIRMENT		Evidence of potential mercury impairment: 1. Mercury fish consumption advisory issued in 2003 remains in effect; and	

	2. A regional mercury TMDL should be completed in 2007.
MONITORING RECOMMENDATIONS	High Priority –Collect mercury samples to support TMDL development. Collect additional pH measurements due to the exceedance. Collect sufficient *E. coli* bacteria to represent at least 3 seasons. Use lower lab detection limits for dissolved metals and selenium. Elevated pH may indicate excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring.

LYMAN LAKE 15020001-0850 1310 Acres	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A D E Q	A&Wc – Inconclusive FBC – Inconclusive FC – Attaining AgI – Attaining AgL – Attaining	Category 2 Attaining some uses		
	E P A	FC – Impaired	Category 5 Impaired	Mercury in fish tissue	EPA listed mercury in 2004 due to mercury fish consumption advisory.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 04/20/2004 – 11/03/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam LCLYM - A 101841	ADEQ Ambient	8 total and 2 dissolved: Mercury 5-6 total and dissolved metals: Cadmium, chromium, copper, lead, nickel, silver, and zinc 6 total metals only: Antimony, arsenic, barium, beryllium, manganese, mercury, selenium, and thallium (3-4 samples per site)	6 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, pH 4 samples: Dissolved oxygen	6 Fluoride 6 Total dissolved solids
Mid Lake LCLYM – B 101842	ADEQ Ambient			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	08/17/2004 – 6.5	Inconclusive – On this one date, there was insufficient dissolved oxygen at one meter but adequate levels at 0.5 and 0.1 meters.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen.	Insufficient *E. coli* bacteria to assess FBC.		
DISCUSSION OF MERCURY IMPAIRMENT		Evidence of potential mercury impairment: Mercury fish consumption advisory issued in 2004 remains in effect.	
MONITORING RECOMMENDATIONS		High Priority – Collect mercury data to support TMDL development. Collect dissolved oxygen samples due to the exceedance. The old turbidity standard (10 NTU) was exceeded in all 3 sampling events (87, 97, and 155 NTU). Low dissolved oxygen and high turbidity may be symptoms of excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect missing core parameters to represent at least 3 seasons.	

MINERAL CREEK	USE SUPPORT	OVERALL ASSESSMENT	
From headwaters to Concho Creek 15020002-648 25.8 Miles	A&Wc – Attaining FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/15/2000 – 08/07/2001 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Forest Road #404 LCMIN018.05 100593	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 4 total metals only: Boron, manganese, and selenium	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, and pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 0 Suspended sediment concentration 4 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	05/01/2001 – 6.4 mg/L	Attaining – Low dissolved oxygen due to low flow and ground water upwelling. Low nutrient concentrations (0.26 mg/L nitrogen, 0.09 mg/L phosphorus).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Use lower lab detection limits for selenium and dissolved mercury.	

NELSON RESERVOIR	USE SUPPORT	OVERALL ASSESSMENT	
15020001 -- 1000 65 Acres	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 04/20/2004 – 8/18/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam LCNEL - A 101840	ADEQ Ambient	2 total and 1-2 dissolved metals: Cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc 2 total metals only: Antimony, arsenic, barium, beryllium, manganese, selenium, and thallium	2 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, pH 4 samples: Dissolved oxygen	0 *E. coli* bacteria 6 Fluoride 6 Total dissolved solids 0 Suspended sediment concentration 0 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	08/17/2004 – 6.2	Inconclusive – There was insufficient dissolved oxygen at one meter but adequate concentrations at 0.5 and 0.1 meters. Insufficient sampling events.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen	Insufficient samples to assess any designated uses	Insufficient sampling events	
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional dissolved oxygen samples due to the low dissolved oxygen. Low dissolved oxygen may be a symptom of excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring due to the one low dissolved oxygen. Collect missing core parameters to represent at least 3 seasons during the assessment period.	

NEWMAN CANYON From headwaters to Upper Lake Mary 15020015 -- 206 9.1 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 9/10/2003 – 04/07/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Upper Lake Mary inlet LCNWC000.10 102369	ADEQ TMDL	4 total and 4 dissolved: Mercury 2 total and 0-2 dissolved: Antimony, arsenic, barium, beryllium, boron cadmium, chromium, copper, lead, manganese, nickel, selenium, silver, thallium, and zinc.	2 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen. 4: dissolved oxygen, pH	4 Fluoride 3 Total dissolved solids 3 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Mercury (dissolved)	0.01 µg/L A&Wc chronic	09/10/2003 – 0.016 µg/L	Inconclusive -- Only 1 exceedance during the assessment period

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Mercury	Insufficient core parameters	Insufficient sampling events	Lab detection limits for dissolved cadmium, copper, lead, and silver were higher than A&Wc chronic criteria.

MONITORING RECOMMENDATIONS	Medium Priority –Collect mercury samples due to the exceedance. Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for dissolved metals. Note that the old turbidity criterion (10 NTU) was exceeded in all 3 samples collected. Collect suspended sediment concentration data. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted

NUTRIOSO CREEK From headwaters to Nelson Reservoir 15020001-017A 13.3 Miles (New reach split at Nelson Reservoir)	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Attaining FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining all uses		Delist turbidity / suspended sediment. See discussion below.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/14/2000 – 11/02/2005 (Ambient monitoring 11/08/2000 – 08/30/2001) NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At weir LCNUT026.83 102008	ADEQ TMDL	4 total and 4 dissolved: Mercury 4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc 4 total metals only: Boron, manganese, mercury, and selenium	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen 12 Dissolved oxygen 12 pH	4 *E. coli* bacteria 4 Fluoride 10 Total dissolved solids 26 Suspended sediment concentration 26 Turbidity
Co Rd 2015 Bridge LCNUT023.45 102003	ADEQ TMDL			
Hwy 180 Bridge LCNUT023.17 102002	ADEQ TMDL			
At Jenson property LCNUT022.30 102001	ADEQ TMDL			
At cemetery before bridge LCNUT021.75 102000	ADEQ TMDL			
At EC Bar Ranch LCNUT020.85 102112	ADEQ TMDL			
Crosswhite reference site LCNUT020.72 101998	ADEQ TMDL			
Near Nutrioso, AZ LCNUT020.23 100936	ADEQ Ambient			
Near EC Bar Ranch LCNUT019.07 102011	ADEQ TMDL			
At old corral LCNUT017.61 101994	ADEQ TMDL			
Near Private Drive LCNUT016.85 101993	ADEQ TMDL			
Upstream of Nelson Res LCNUT015.61 100344	ADEQ TMDL			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	06/12/2001 – 5.1 mg/L 08/30/2001 – 6.5 mg/L 06/10/2004 – 4.2 mg/L	Attaining – At least one exceedance was due to natural conditions of low flow and ground water upwelling (flow 0.1 cfs). Only 2 other exceedances in 12 samples (binomial).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
DELISTING CRITERIA FOR TURBIDITY IMPAIRMENT		Although this reach was originally listed as impaired by turbidity, the turbidity standard was replaced by a suspended sediment concentration (SSC) criterion in 2002. Turbidity / suspended sediment is to be delisted from this reach as the SSC standard has not been exceeded with 26 samples. Watershed improvements projects have also been completed in this reach that should reduce sediment loadings from grazing activities.	
MONITORING RECOMMENDATIONS		Medium Priority –Continue effectiveness monitoring for TMDL implementation strategies. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted Use lower lab detection limits for selenium and dissolved mercury.	

NUTRIOSO CREEK From Nelson Reservoir to Picnic Creek 15020001-017B 13.3 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 4A Not attaining	Suspended sediment (turbidity)	Turbidity TMDL approved in 2000.

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/14/2000 – 11/02/2005 (Ambient monitoring 11/08/2000 – 08/30/2001)		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Nelson Reservoir LCNUT013.33 101722	ADEQ TMDL	1 total and 1 dissolved: Mercury	4 Dissolved oxygen 4 pH	1 *E. coli* bacteria 4 Suspended sediment concentration 2 Turbidity
Highway 180 milepost 407 LCNUT011.29 101988	ADEQ TMDL			
Near Molina Basin LCNUT009.31 101982	ADEQ TMDL			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters		
MONITORING RECOMMENDATIONS	Medium Priority –Continue effectiveness monitoring for TMDL implementation strategies. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Insufficient suspended sediment concentration data in this reach to determine whether standards are currently being met. Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for selenium and dissolved mercury.		

NUTRIOSO CREEK From Picnic Creek to Little Colorado River 15020001 -- 015 3.5 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 4A Not attaining	Suspended sediment (turbidity)	Turbidity TMDL approved in 2000.

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/14/2000 – 11/02/2005 (Ambient monitoring 11/08/2000 – 08/30/2001)		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
No current data Older data collected for sites: 102010 and 104318				Remains impaired until suspended sediment concentration or other data indicates standards are being attained.

PORTER CREEK From headwaters to Show Low Creek 15020005 -- 246 4.4 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Attaining FBC – Attaining FC – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 10/23/2002 – 06/11/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above Scott Reservoir LCPRT002.28 101415	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, mercury, and zinc 3-4 total metals only: Boron, lead, manganese, and selenium	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, and pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	06/11/2003 – 4.6 mg/L	Attaining – Low dissolved oxygen due to low flow and ground water upwelling. Flow was only 0.01 cfs.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and some of the dissolved copper samples were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Use a lower lab detection limit for selenium and dissolved copper.	

RAILROAD CANYON From headwaters to Upper Lake Mary 15020015 -- 204 5.4 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 03/09/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Upper Lake Mary inlet LCRRC000.05 102370	ADEQ TMDL	1 total and dissolved metals: Chromium, mercury, nickel, and zinc 1 total metals only: Antimony, arsenic, barium, beryllium, boron cadmium, copper, lead, manganese, selenium, silver, and thallium.	1 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	1 Fluoride 1 Total dissolved solids 1 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events	Lab detection limits for dissolved metals (cadmium, copper, lead and silver) were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for dissolved metals.	

RAINBOW LAKE 15020005 -- 1170 110 Acres	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Impaired FC – Attaining AgI – Impaired AgL – Impaired	Category 4A Not attaining	Narrative nutrients, low DO, and pH	A narrative nutrient TMDL was approved in 2000 due to low dissolved, high pH, excess weeds, and occasional fish kills. Implementing strategies to reduce nutrient loading.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 06/13/2002; 08/19/2004; 05/24/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam LCRAI - A 100069	ADEQ Ambient	4 total and dissolved metals: Cadmium, chromium, copper, lead, nickel, selenium, and zinc 4 total and 0-1 dissolved: Antimony, arsenic, barium, beryllium, boron, manganese, mercury, silver, thallium	4-5 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	7 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids
Mid lake LCRAI - B 100070	ADEQ Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	08/19/2004 – 6.0 mg/L (both sites)	Remains impaired – Exceedances in 1 of 3 sampling events. (Binomial)
pH (high)	<9.0 SU	08/19/2004 – 9.4 SU 06/13/2004 – 9.24 SU	Remains impaired – Exceeded criterion on 2 of 3 sampling events (4 of 5 samples). (Binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limit for selenium was higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority –Continue monitoring to determine effectiveness of implementation strategies to reduce loadings. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring.	

RIO DE FLAG From Flagstaff WWTP discharge to San Francisco Wash 15020015 – 004B 3.7 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wedw – Attaining PBC – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 12/21/2000 – 07/30/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Doney Park LCRDF002.11 101127	ADEQ Ambient	4-5 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 4 total metals only: Boron, manganese, and selenium	4 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wedw chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Use a lower lab detection limit for selenium and dissolved mercury. (Note: A site specific Aquatic and Wildlife copper standard of 36 µg/L applies to this reach.)	

RIVER RESERVOIR	USE SUPPORT	OVERALL ASSESSMENT	
15020001-1220 140 Acres	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 04/17/2001 – 10/18/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid Lake LCRIV - B 102556	AGFD Ambient	3 total metals: Copper, lead, manganese, and zinc	3 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, pH 4 samples: Dissolved oxygen	3 Total dissolved solids

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Missing dissolved metals (cadmium, copper, and zinc), mercury, *E. coli* bacteria, boron, manganese, and lead to assess designated uses.		
MONITORING RECOMMENDATIONS		Low Priority – Collect missing core parameters to represent at least 3 seasons during the assessment period.	

SHOW LOW CREEK From headwaters to Linden Wash 15020005 – 012 19.5 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Attaining FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/15/2000 – 08/06/2001 NUMBER AND TYPES OF SAMPLES Metals	Nutrients – Related	Other
Near Show Low, AZ USGS #09390500 LCSHL021.46 100340	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 4 total metals only: Boron, manganese, and selenium	4 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 3 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	08/06/2001 – 5.0 mg/L	Attaining – Low dissolved oxygen due to natural conditions of low flow and ground water upwelling. (Flow was 0.5 cfs)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Use a lower lab detection limit for selenium and dissolved mercury. The old turbidity standard of 10 NTU was exceeded all 3 samples (15.25. and 57). Recommend collecting suspended sediment concentration data. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted	

SILVER CREEK	USE SUPPORT	OVERALL ASSESSMENT	
From headwaters to Show Low Creek 15020005 – 013 33.6 Miles	A&Wc – Attaining FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/15/2000 – 08/07/2001 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below AGFD hatchery LCSIL043.84 101125	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 4 total metals only: Boron, manganese, and selenium	4 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	08/07/2001 – 6.4 mg/L	Attaining – Low dissolved oxygen due to natural conditions of low flow and ground water upwelling. Low nutrients (nitrogen 0.4 and phosphorus 0.096 mg/L)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Use a lower lab detection limit for selenium and dissolved mercury. The old turbidity standard of 10 NTU was exceeded in 1 of 4 samples (19.4). Recommend collecting suspended sediment concentration data. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted	

SILVER CREEK From Sevenmile Draw to Little Colorado River 15020005 – 001 9.3 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 10/22/2002 – 01/28/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
250 Feet below USGS gage Below USGS #09393500 LCSIL013.65 100337	ADEQ Ambient	2 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, and zinc 1-2 total metals only: Boron, lead, manganese, mercury, and selenium	2 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	2 *E. coli* bacteria 2 Fluoride 2 Total dissolved solids 1 Suspended sediment concentration 2 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events.	Lab detection limit for selenium was higher that A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Collect sufficient core parameters to represent at least 3 seasons. Use a lower lab detection limit for selenium. The old turbidity standard of 10 NTU was exceeded in both samples (136 and 23 NTU). Recommend collecting suspended sediment concentration data. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted	

SOLDIER'S ANNEX LAKE 15020008 -- 1430 120 Acres	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive		
	EPA	FC – Impaired	Category 5 Impaired	Mercury in fish tissue	EPA listed in 2004 due to mercury in fish tissue.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 09/18/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Dam LCSAL - A 103354	AGFD Ambient	None	1 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events	
DISCUSSION OF MERCURY IMPAIRMENT		Evidence of potential mercury impairment: 1. Mercury fish consumption advisory issued in 2003 remains in effect; and 2. A regional mercury TMDL should be approved in 2007.	
MONITORING RECOMMENDATIONS		High Priority –Collect mercury samples to support TMDL development. Collect core parameters to represent at least 3 seasons during the assessment period.	

SOLDIER'S LAKE 15020008 -- 1440 28 Acres	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A D E Q	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgI – Attaining AgL – Attaining	Category 2 Attaining some uses		
	E P A	FC – Impaired	Category 5 Impaired	Mercury in fish tissue	EPA listed in 2004 due to mercury in fish tissue.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 05/29/2003 – 04/12/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid lake LCSOI -A 101733	ADEQ and AGFD Ambient	3-4 total and dissolved metals: Chromium, mercury, nickel, selenium, and zinc 4 total and 0-2 dissolved: Antimony, arsenic, barium, beryllium, boron, cadmium, copper, lead, manganese, selenium, silver, thallium	4-5 sample: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 Fluoride 5 Total dissolved solids 2 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	07/02/2003 – 6.2 mg/L 07/13/2003 – 6.7 mg/L	Inconclusive – Low dissolved oxygen in 2 of 5 sampling events. (Binomial requires a minimum of 5 exceedances and 20 samples to assess as impaired.)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient *E. coli* bacteria, dissolved copper, and dissolved cadmium to assess FBC and A&Wc		Lab detection limits for dissolved metals (cadmium, copper, lead, mercury, selenium, and silver) were higher than applicable criteria for at least 1 sample.
DISCUSSION OF MERCURY IMPAIRMENT		Evidence of potential mercury impairment: 1. Mercury fish consumption advisory issued in 2003 remains in effect; and 2. A regional mercury TMDL should be approved in 2009.	
MONITORING RECOMMENDATIONS		High Priority –Collect mercury samples to support TMDL development. Collect additional dissolved oxygen measurements due to the exceedance. Low dissolved oxygen may be a symptom of excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect missing core parameters to represent at least 3 seasons. Use lower lab detection limits for dissolved metals.	

TUNNEL RESERVOIR	USE SUPPORT	OVERALL ASSESSMENT	
15020001-1550 40 Acres	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgI -- Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 04/17/2001 – 10/17/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid Lake LCTUN - B 102568	AGFD Ambient	3 total metals: Copper, lead, and zinc 2 total metals: Manganese	2-3 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, pH 4 samples: Dissolved oxygen	3 Total dissolved solids

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	08/17/2004 – 3.7 mg/L	Inconclusive – Only 1 exceedance out of 2 samples. (Binomial)
Nitrogen	1.1 mg/L A&Wc and FBC	07/25/2001 – 1.1 mg/L	Inconclusive – Only 1 exceedance in 3 samples. (Binomial) Note that nitrogen was also elevated but not exceeding the standard (at 0.91 mg/L) on 10/17/2001.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen and nitrogen	Missing dissolved metals, mercury, *E. coli* bacteria, boron, manganese, and lead to assess designated uses.		
MONITORING RECOMMENDATIONS		Medium Priority – Collect low dissolved oxygen and nitrogen samples due to exceedances. Low dissolved oxygen and high nitrogen may indicate excess nutrient loading to this lake. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect missing core parameters to represent at least 3 seasons during the assessment period.	

WEST FORK LITTLE COLORADO RIVER From headwaters to Government Springs 15020001-013A 9.1 Miles Unique Water	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Attaining FBC – Attaining FC – Inconclusive	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/07/2000 – 06/16/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Sheep's Crossing LCWLR004.09 100945	ADEQ Ambient	3-7 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 7 total and 0 dissolved: Boron, manganese, and selenium	6-7 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	7 *E. coli* bacteria 7 Fluoride 7 Total dissolved solids 3 Suspended sediment concentration 7 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Mercury	0.6 µg/L FC	10/23/2002 – 0.64 µg/L	Inconclusive – Only 1 exceedance in 7 samples. (Binomial)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Mercury	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional mercury data due to the exceedance. Use lower lab detection limits for selenium and dissolved mercury.	

WEST FORK LITTLE COLORADO RIVER From Government Springs to Little Colorado River 15020001-013B 2.2 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Attaining FC – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 03/30/2000 – 06/08/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Government Springs LCWLR000.92 100328	ADEQ Ambient	7-21 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc 21 total metals only: Boron, manganese, and selenium 20 total and 12 dissolved: Mercury	20-21 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	21 *E. coli* bacteria 21 Fluoride 18 Total dissolved solids 12 Suspended sediment concentration 21 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Copper (dissolved)	4.9 µg/L at 29 mg/L hardness 3.2 µg/L at 22 mg/L hardness A&Wc acute	03/20/2002 – 13 µg/L 12/29/2004 – 22 µg/L	Inconclusive – Only 1 exceedance in the last 3 years of monitoring (2 during the assessment period). However, the total copper analysis on both dates indicated that total copper was <10 mg/L. Because the dissolved copper should not exceed the total copper by more than 10%, these values alone are not reliable enough to determine impairment. No anthropomorphic sources of copper in the watershed.
Dissolved oxygen	7.0 mg/L A&Wc	06/28/2000 – 6.7 mg/L 08/14/2000 – 6.5 mg/L 08/13/2003 – 5.8 mg/L	Attaining – Low dissolved oxygen is due to natural conditions of ground water upwelling.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Copper	Collected all core parameters		Lab detection limits for selenium and dissolved metals (cadmium, copper, lead, mercury, and zinc) were higher than A&Wc chronic criteria in 4-22 samples.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional copper samples due to the exceedances. Use lower lab detection limits for selenium and dissolved metals.	

WILLOW SPRINGS LAKE 15020010-1670 160 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 02/22/2002 – 07/15/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam LCWIS - A 100091	AGFD and ADEQ Ambient	1-2 total and 0-2 dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc	3-5 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, pH, dissolved oxygen	1 *E. coli* bacteria 2 Fluoride 5 Total dissolved solids 2 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	07/16/2002 – 6.2 mg/L 08/08/2003 – 6.6 mg/L	Inconclusive – Low dissolved oxygen in2 of 4 sampling events. (Binomial method requires a minimum of 5 exceedances and 20 samples to determine impairment.)
Selenium	2.0 µg/L A&Wc chronic	08/08/2003 – 6.0 µg/L	Inconclusive – Only 1 exceedance in last 3 years of monitoring.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen and selenium	Insufficient core parameters	Insufficient sampling events	Lab detection limits for dissolved metals (cadmium, copper, mercury, and silver) were higher than A&Wc chronic criteria.

MONITORING RECOMMENDATIONS	
	Medium Priority – Collect additional dissolved oxygen and selenium samples due to the exceedances. Low dissolved oxygen may indicate excess nutrients. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect missing core parameters to represent at least 3 seasons during the assessment period. Use lower lab detection limits for dissolved metals.

WOODS CANYON LAKE	USE SUPPORT	OVERALL ASSESSMENT	
15020010-1700 70 Acres	A&Wc – Inconclusive FBC – Attaining FC – Attaining DWS – Attaining AgI – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIODS: 10/19/2000 –11/02/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam LCWCL - A 100092	AGFD and ADEQ Ambient	4-6 total and 0-2 dissolved: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc	11-16 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, pH, dissolved oxygen	3 *E. coli* bacteria 7 Fluoride 16 Total dissolved solids 11 Turbidity
Mid lake LCWCL – B 100093	ADEQ Ambient			
At boat ramp LCWCL – BR 101324	ADEQ Ambient (bacteria only)			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	7.0 mg/L A&Wc	07/16/2002 – 6.2 mg/L 10/28/2002 – 6.2 mg/L 07/23/2003 – 6.6 mg/L 10/20/2003 – 5.9 mg/L 08/19/2004 – 5.5 mg/L	Inconclusive – Low dissolved oxygen in 5 of 13 sampling events (5 of 16 samples). (Binomial method requires a minimum of 5 exceedances and 20 samples to list as impaired.)
pH	>6.5 SU A&Wc, FBC, AgL	10/19/2000 – 6.38 SU	Attaining – Only 1 low pH in 13 sampling events (1 of 16 samples) (Binomial).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen and pH	Insufficient dissolved copper, cadmium, and zinc needed to assess A&Wc		Lab detection limits for dissolved metals (cadmium, copper, lead, mercury, and silver) and total selenium were higher than A&Wc chronic criteria in one or more sample.
MONITORING RECOMMENDATIONS		Medium Priority – Collect additional dissolved oxygen due to the exceedances. Low dissolved oxygen may indicate excess nutrient loadings. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect missing core parameters to represent at least 3 seasons during the assessment period. Use lower lab detection limits for dissolved metals and selenium.	

Middle Gila Watershed

Watershed Description

This watershed encompasses the Gila River drainage area below Coolidge Dam (San Carlos Reservoir) in the east to Painted Rock Dam in the west. It excludes the Santa Cruz River, the San Pedro River, and the Salt River drainage above Granite Reef Dam. The Salt River drainage area below Granite Reef Dam is included in this watershed (instead of the Salt Watershed) because the canals and diversions at the dam hydrologically disconnect the system from the rest of the lower Salt River drainage.

The Phoenix metropolitan area, located in this 12,250 square mile watershed, consists of more than three million people (2000 census) and continues to be one of the fastest growing areas in the United States. Land ownership in the Middle Gila is approximately: 65% federal land, 25% private land, 4% state land, and 4% tribal land. Within the metropolitan area, irrigated agriculture uses are rapidly being displaced by urbanization. Outside the urbanized area, livestock grazing is the primary land use. Mining (primarily now abandoned) has occurred across this watershed, with more concentration south of Prescott.

Elevations range from 7,400 feet (above sea level) to 1,100 feet at Painted Rocks Reservoir. Most of the watershed is below 5,000 feet in elevation, with Sonoran Desert flora and fauna and warmwater aquatic communities.

Water Resources

This area receives little rainfall (approximately 13 inches a year); therefore, surface water flow is primarily attributed to releases from upstream impoundments, effluent from wastewater treatment plants, and agricultural return flows.

An estimate of surface water resources in the Middle Gila Watershed is provided in the following table. Waters on Tribal lands are not assessed by ADEQ; therefore, those statistics are shown separately.

Estimated Surface Water Resources in the Middle Gila Watershed

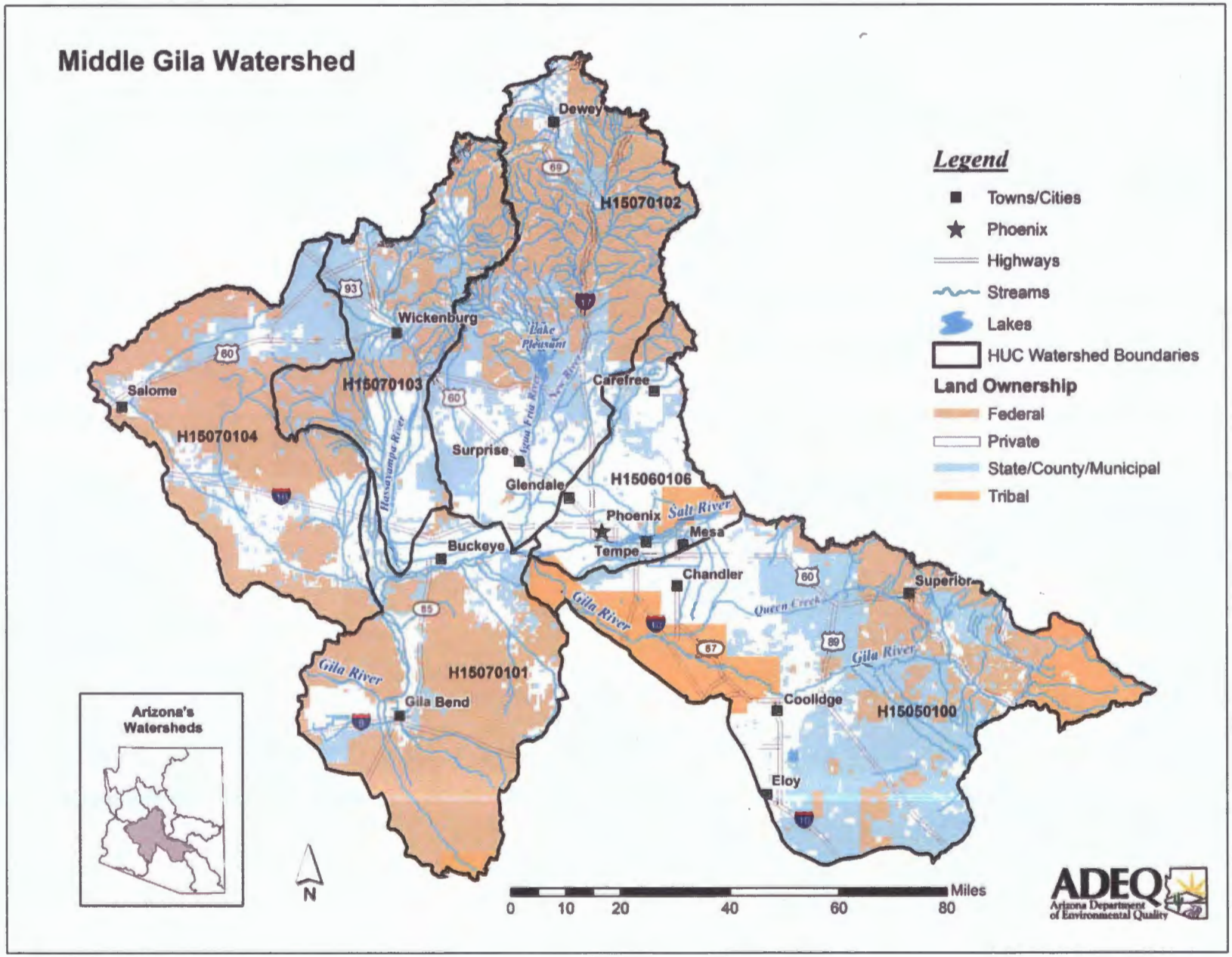
Excluding Tribal Lands

	Perennial	Intermittent	Ephemeral
Stream miles	165	1,210	5,460
	Perennial	Non-perennial	
Lake acres	10,320	6,830	

On Tribal Lands – *Not Assessed*

	Perennial	Intermittent	Ephemeral
Stream miles On Tribal Lands	0	10	1,105
	Perennial	Non-perennial	
Lake acres On Tribal Lands	240	0	

Ambient monitoring focuses on perennial waters; however, special investigations may identify water quality problems on intermittent and even ephemeral waters. Estimated miles and acres are based on USGS digitized hydrology at 1:100,000 and have been rounded to the nearest 5 miles or 5 acres.


Middle Gila Watershed
Legend
Towns/Cities
Phoenix
Highways
Streams
Lakes
HUC Watershed Boundaries
Land Ownership
Federal
Private
State/County/Municipal
Tribal
Dewey
H15070102
Wickenburg
Lake Pleasant
Carefree
H15070103
Salome
H15070104
Surprise
Agua Fria River
New River
Hassayampa River
Glendale
H15060106
Phoenix
Salt River
Mesa
Tempe
Buckeye
Chandler
Superior
Queen Creek
Gila River
H15070101
Gila Bend
Coolidge
H15050100
Eloy
Arizona's Watersheds
N
0 10 20 40 60 80
Miles
ADEQ
Arizona Department of Environmental Quality

Watershed Partnerships

- Tres Rios River Management Group.
  The area of interest is delineated approximately by the Salt River and Gila River drainage in the Phoenix Metropolitan area between Southern (north), Baseline (south), 83rd Avenue (east) and Agua Fria River (west).This group works on water issues such as pollutants, flood flows, agriculture stormwater runoff, agriculture irrigation and dewatering, concentrated animal feeding operation discharges, wastewater treatment plant discharges, landfill leachate, ground water inflow, sand and gravel area releases, and degradation of wildlife habitat. There are quarterly meetings at the Flood Control District offices in Phoenix. Contact Debbi Radford, City of Phoenix at (602) 262-1828 or debbi.radford@phoenix.gov.

- Upper Agua Fria Watershed Partnership
  The area of interest is the Agua Fria River drainage, excluding the area in the Prescott Active Management Area (AMA) or the Phoenix AMA. This group works on water quality and quantity issues such as growth, ranching and grazing, leaking underground storage tanks, illegal dumping, and water rights. They meet at Arcosanti on the 1st Tuesday of the month. For more information, contact Mary Hoadley at (928) 632-7135 or earthhous@aol.com.

- Southwest Strategy Water Task Team
  A pilot project is located on the Upper Agua Fria drainage area. Federal, tribal, state, and local entities are identifying and prioritizing water resource concerns in this area to provide coordinated and effective actions. Meetings occur as needed. Contact Mary Reece, (602) 206-3884 or mreece@lc.usbr.gov.

Special Studies and Water Quality Improvement Projects

The following studies and water quality improvement projects have occurred in the Middle Gila Watershed during the last 5 years.

Total Maximum Daily Load Analyses – The following TMDL analyses have been completed, are ongoing, or are scheduled to be completed in this watershed. Further information about the status of these investigations or a copy of the TMDL, if completed, can be obtained at ADEQ's website: www.azdeq.gov.

- Alvord Park Lake in south Phoenix is impaired due to ammonia.
  Elevated ammonia may represent a risk to aquatic life. This lake is an important urban recreational area. The TMDL investigation is scheduled to be initiated in 2007.

- Chaparral Lake in Scottsdale is impaired due to low dissolved oxygen and bacteria (*Escherichia coli*). Swimming or wading in the lake is prohibited; therefore, public health risk due to the presence of *E. coli* is reduced. Low dissolved oxygen may pose problems for aquatic life. Both low dissolved oxygen and high *E. coli* are likely related to ducks and other wildlife that congregate at this lake. Both TMDLs are scheduled to be initiated in 2007.

- Cortez Park Lake in Phoenix is impaired due to low dissolved oxygen and high pH
  Low dissolved oxygen and high pH are frequently associated with excess nutrient loadings and eutrophic conditions which may lead to algal blooms and even fish kills. The narrative nutrient implementation guidance being developed by ADEQ may be used in developing these TMDLs as numeric nutrient standards have not been established. Both TMDLs are scheduled to be initiated in 2007.

- French Gulch, a tributary to the Hassayampa River near Walnut Grove, is impaired due to cadmium, copper, and zinc. Metal concentrations may represent a risk to aquatic and wildlife communities. TMDLs were completed and for this stream in 2005 and identified the Zonia Mine as the primary source of these pollutants, although natural background and other inactive and abandoned mine

workings may also be contributing loads. Currently the mine is operating three production wells to draw down the ground water table and reduce metal loading to the surface water from the ground water. ADEQ will be working with the owners of Zonia Mine and other stakeholders to develop and implement management measures to further reduce loadings and pollutant risks to the environment.

- Hassayampa River is impaired due to cadmium, copper and zinc. Metal concentrations may pose a risk to aquatic and wildlife communities. TMDLs were approved in 2002. Several abandoned mine tailings were identified as primary sources of these contaminants including: McCleur tailings, Senator Gold Mine adit and tailings, and the Wetland tailings. The U.S. Forest Service has initiated several remediation projects, and ADEQ is working with interested stakeholders to prepare a TMDL Implementation Plan to identify other actions and watershed management measures.

- Several reaches of the Gila River, Painted Rocks Reservoir, and the Salt River and the Hassayampa River reaches that flow into the Gila River are all impaired by pesticides in fish tissue – specifically, DDT metabolites, toxaphene, and chlordane. (See also Painted Rocks Borrow Pit in the Colorado – Lower Gila Watershed.) Although these pesticides have been banned from use for at least 20 years, these pesticides remain at concentrations that may pose a high risk to aquatic life and species that prey on them, including humans who may eat the fish. Fish consumption advisories have been set for these waters for more than 10 years. This is a complex TMDL due to the size of the drainage and vast area where these pesticides were historically applied.

- Mineral Creek, a tributary to the Gila River near Kelvin, is impaired due to copper and selenium. Both copper and selenium concentrations may pose a risk to aquatic life and wildlife. Recent remediation efforts have been effective in mitigated copper contamination, as exceedances only occur during extreme flow events; however, those methods have not reduced the selenium loads.

- Queen Creek near Superior is impaired due to copper. Copper concentrations may pose a risk to aquatic life and wildlife. A TMDL was initiated in 2005 and is scheduled to be completed in 2009.

- Turkey Creek, a tributary to the Agua Fria, is impaired due to copper and lead. Metals concentrations may represent a risk to aquatic life and wildlife. A draft TMDL, completed September 22, 2006, indicates that the primary sources of metals are inactive and abandoned mines, such as Golden Turkey Mine and Golden Belt Mine. ADEQ has been coordinating with the U.S. Forest Service in identifying remediation actions for mines on Forest Service land. ADEQ has been working with stakeholders to identify and implement strategies or actions that would bring Turkey Creek back into compliance with its standards.

Water Quality Improvement Grant Projects – ADEQ awarded the following Water Quality Improvement Grants (319 Grants) in this watershed. More information concerning these grants or projects can be obtained at: http://www.azdeq.gov/environ/water/watershed/fin.html.

- **Bar S Ranch Septic System Project**
  Bar S Ranch (2001)
  Replace a failing septic system to protect Chicken Springs Wash, at Mingus Mountain.

- **Algal Bioreactor Filtration Project**
  Universal Entech, LLC (2002)
  Develop and demonstrate an algal biological filtration system to treat agricultural runoff waters from irrigation drainage ditches prior to entering the Gila River. The goal was to reduce nutrient loading (including Painted Rocks Borrow Pit downstream).

- **Upper Hassayampa River Watershed Restoration Project**
  Maughan Ranches (2003)

Exclude cattle from riparian areas along the Hassayampa River (from Milk Creek to Hassayampa River Canyon Wilderness Area) in an effort to increase riparian vegetation, stabilize soil, and reduce sediment.

- **Upper Agua Fria Wildcat Dumpsite Cleanup Project**
  Upper Agua Fria Watershed Partnership (2004)
  Clean up illegal dump sites along Big Bug Creek, a tributary to the Agua Fria River. Sites were located along Big Bug Creek between Cordes Junction and Mayer.

- **Gibson Mine Remediation Project**
  Franciscan Friars of California (2005 and 2006)
  Design, construct, and implement a manmade wetland to reduce copper, beryllium, zinc, and turbidity loadings to Pinto Creek and Mineral Creek.

Water Protection Fund Projects – The following Water Protection Fund Projects were awarded by the Arizona Department of Water Resources. More information about these funds or projects can be obtained from the ADWR web site at: http//www.azwater.gov.

- **Tres Alamos Ranch Tank Rehabilitation Project**
  Tres Alamos Ranch (2000)
  Exclude grazing from 35 acres near Wickenburg, decommission three cattle tanks (replanting the dirt tanks area with native plants), and replace dirt tanks at 2 other sites with cattle drinkers.

- **Papago Park Green Line Project**
  The city of Tempe and the Arizona Historical Society (2000)
  Obtain water rights to sustain a riparian area. The project would also restore and regenerate riparian health and provide educational opportunities for the public.

- **Lynx Creek Restoration Project**
  Prescott National Forest (2003)
  Restore a segment of Lynx Creek, including two wetland areas.

U.S. Army Corps of Engineers' Ecosystem Restoration Projects – Ecosystem restoration, environmental stewardship, and radioactive site cleanup projects are funded through the annual federal Energy and Water budget. The purpose of ecosystem restoration is to re-establish attributes of a natural functioning and self-regulating system.

- **Va Shly 'ay Akimel**
  Restore riparian ecosystem using native vegetation along the Salt River between Granite Reef Dam to the Loop 101 Bridge (14 miles and 17,435 acres). The project will establish a functional floodplain in the unconstrained reaches. To provide passive recreational opportunities, improved habitat, and provide educational opportunities.

- **Rio Salado – Tempe Reach**
  Restore threatened and endangered species habitat by planting mesquite, cottonwood-willow, wetland, strand scrub, and open edge habitat along the Salt River between McClintock Avenue and Priest Drive, and from McKellips road to Tempe Town Lake.

- **Rio Salado – Phoenix Reach**
  Restore riparian habitat along the Salt River from Interstate 10 Bridge to 19th Avenue (5 miles and 580 acres). A series of shallow pools will be connected by a perennially flowing stream. Three parking areas will be added for public access to the restored area.

- **Rio Salado Oeste**
  The objective is to increase the functional riparian along the Salt River, between 19th Avenue and 83rd Avenue. To attract wetland and riparian avian species, and establish the presence of amphibians, reptiles,

mammals and birds, while suppressing undesirable fish and wildlife species and invasive plants. The project is to increase passive recreational and educational opportunities and reduce flood damage.

Other Water Quality Studies

- **Phoenix Metropolitan Reservoir Study**
  David Walker, University of Arizona
  This is an ongoing and comprehensive study of water quality in reservoirs serving the Phoenix metropolitan area. Goal is to collect and analyze data to answer water quality management questions in a proactive manner. A yearly report is produced. In 2005, the report provided information about: climate and drought effects on water quality, wildfire effects on water quality, harmful algal blooms, atmospheric deposition and the use of sediment to look at accumulation of pollutants, and endocrine disruption compounds.

- ***Hydrologic Characteristics of the Agua Fria National Monument, Central Arizona, Determined from the Reconnaissance Study***
  John B. Fleming, U.S. Geological Survey, in cooperation with the Bureau of Land Management
  A characterization of the hydrologic conditions in the newly created Agua Fria National Monument based on existing hydrologic and geologic information and stream flow data collected in 2002.

- **Tres Rios Constructed Wetlands Project**
  City of Phoenix and Corps of Engineers
  The Tres Rios Constructed Wetlands demonstrates the practicality and usefulness of constructed wetlands in reclaiming wastewater effluent while establishing wildlife habitat in arid regions.

- ***Determination of Channel Change for Selected Streams, Maricopa County, Arizona***
  Joseph P. Capesium and Ted W. Leham – U.S. Geological Survey in cooperation with the Flood Control District of Maricopa County (2002)
  Alluvial stream channels in arid regions are dynamic and channel changes can occur over short time periods, ranging from hours to weeks. A channel can scour during higher discharges and fill during lower discharges, causing short-term changes. In Maricopa County, 10 sites on seven streams were studied to determine the lateral and vertical change of channel. All channels showed some change in cross-section area or hydraulic radius, but the direction and magnitude of change varied considerably – some are more dynamic than others. Long-term channel change (years to decades) was also studied as this would have more effect on potential flood-hazards. Three sites appeared to have substantial long-term channel change.

- ***Reconnaissance of the Upper Aqua Fria Watershed and Hydrologic Analysis***
  Loyd O. Barnett, Richard H. Hawkins, and D. Phillip Guertin, School of Renewable Natural Resources, University of Arizona, in cooperation with the Upper Agua Fria Watershed Partnership
  This report provides a description of the watershed characteristics, including hydrology and watershed issues. The report primarily focuses on water quantity and water rights, with a brief summary of water quality concerns. The report established strategies to address the water budget, water rights, watershed health, and water quality concerns.

- ***Status of Federal and State Listed Warm Water Fishes of the Gila River Basin, with Recommendations for Management***
  Desert Fishes Team Report Number 1 (2003)
  This report reviews the status of 12 federal and state listed native warm water fishes in the Gila River basin and the post 1967 recovery and conservation actions taken by all agencies, organizations, or parties.

- ***Assessment of Selected Inorganic Constituents in Streams in the Central Arizona Basins Study Area, Arizona and Northern Mexico, through 1998***
  David Anning – U.S. Geological Survey, National Water Quality Assessment Program (2003)

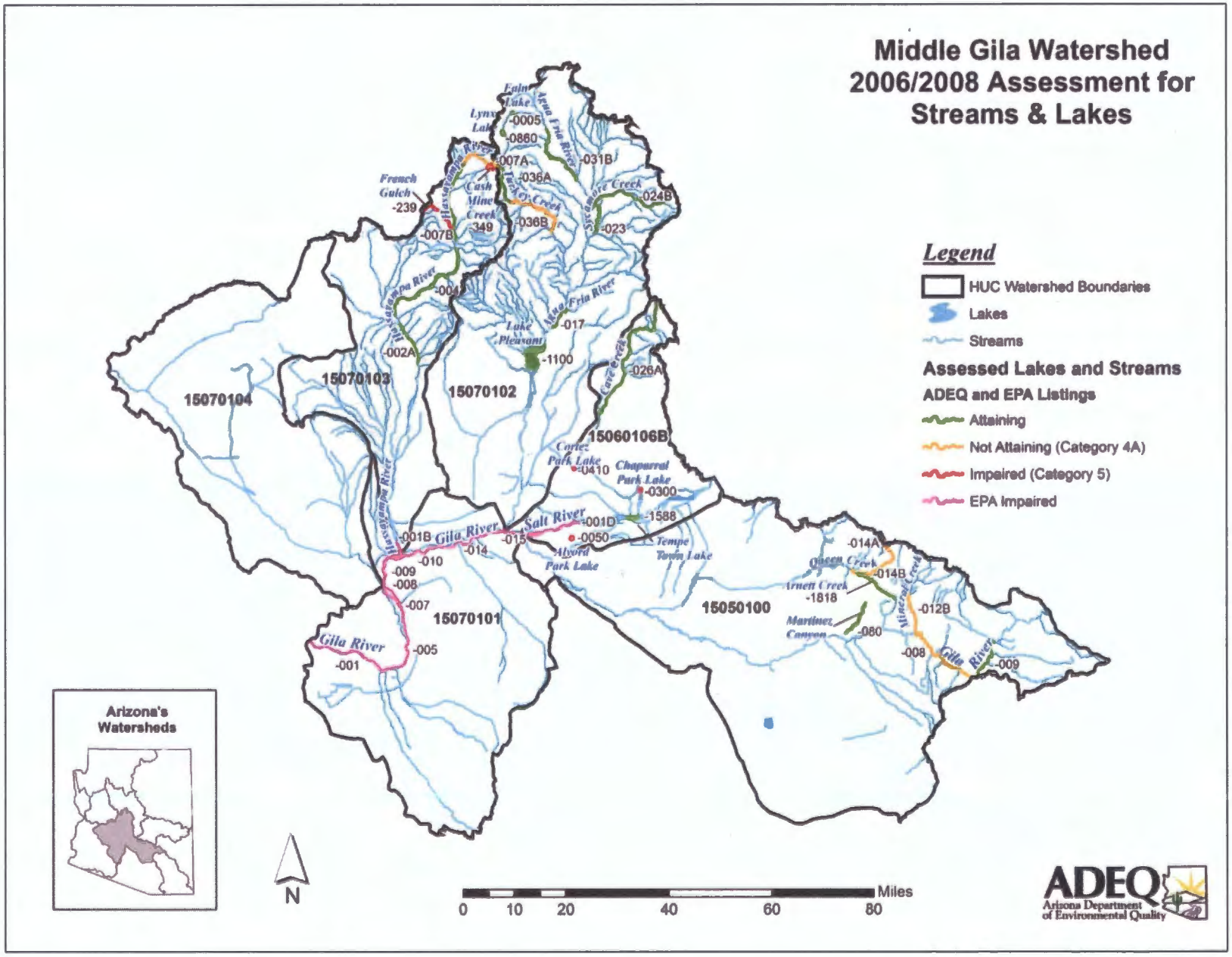
Inorganic chemical data (dissolved solids, suspended sediment, and nutrients) and stream properties (temperature, pH, dissolved oxygen) were analyzed to assess water quality, determine natural and human factors affecting water quality, and compute stream loads.

Assessments

The Middle Gila Watershed can be separated into the following drainage areas (subwatersheds):

15050100 Gila – Queen Creek Drainage Area (from San Carlos Reservoir to Salt River)
15060106B Salt – Cave Creek Drainage Area (from Granite Reef Dam to Gila River)
15070101 Gila – Painted Rock Drainage Area (from Salt River to Painted Rock Dam)
15070102 Agua Fria River Drainage Area
15070103 Hassayampa River Drainage Area
15070104 Centennial River Drainage Area

These drainage areas and the surface waters assessed as "attaining" or "impaired" are illustrated on the following watershed map. Methods used to complete these assessments are described in the "Surface Water Assessment Methods and Technical Support" document (2006).


Middle Gila Watershed
2006/2008 Assessment for
Streams & Lakes
Legend
HUC Watershed Boundaries
Lakes
Streams
Assessed Lakes and Streams
ADEQ and EPA Listings
Attaining
Not Attaining (Category 4A)
Impaired (Category 5)
EPA Impaired
15070104
15070103
15070102
15070101
15060106B
15050100
Lake Pleasant
Cortez Park Lake
Chaparral Park Lake
Alvord Park Lake
Tempe Town Lake
Salt River
Gila River
Agua Fria River
Hassayampa River
Sycamore Creek
Cave Creek
Queen Creek
Arnett Creek
Martinez Canyon
Minnehaha Creek
French Gulch
Cash Mine Creek
Lynx Lake
-0005
-0860
-007A
-031B
-036A
-024B
-023
-239
-007B
-349
-036B
-004
-017
-1100
-002A
-026A
-0410
-0300
-1588
-001D
-0050
-001B
-015
-014
-010
-009
-008
-007
-005
-001
-014A
-014B
-1818
-012B
-080
-008
-009
Arizona's Watersheds
N
0 10 20 40 60 80 Miles
ADEQ
Arizona Department of Environmental Quality

AGUA FRIA RIVER From State Route 169 to Yarber Wash 15070102 – 031B 17.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining DWS – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/26/2002 – 05/22/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below USGS gage #09512450 MGAFR109.37 101672	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, and zinc 4 total and 0-1 dissolved: Boron, lead, manganese, mercury, and selenium	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Use lower lab detection limits for selenium and dissolved mercury	

AGUA FRIA RIVER From Sycamore Creek to Big Bug Creek 15070102 -- 023 9.1 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining DWS – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/21/2001 – 09/20/2002		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below USGS gage #09512500 MGAFR087.06 100710	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, and zinc 4 total metals only: Boron, lead, manganese, mercury, and selenium	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	3 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limit for selenium was higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Use lower lab detection limits for selenium.	

AGUA FRIA RIVER From Little Squaw Creek to Cottonwood Creek 15070102 – 017 5.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining DWS – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 11/21/2001 – 09/20/2002		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Rock Springs USGS gage #09512800 MGAFR053.33 101304	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, beryllium, boron, cadmium, chromium, copper, and zinc 4 total metals only: Boron, lead, manganese, mercury, and selenium	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	11/21/2001 – 1.7 mg/L 05/08/2002 – 4.1 mg/L	Attaining – Low dissolved oxygen due to groundwater upwelling and low flow. (Flow 0.01-0.05 cfs). Very low nutrient loads (0.03-0.1 mg/L nitrogen, 0.08-0.09 mg/L phosphorus).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limit for selenium was higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Use a lower lab detection limit for selenium.	

ALVORD LAKE 15060106B -- 0050 27 ACRES	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired PBC – Inconclusive FC – Inconclusive	Category 5 Impaired	Ammonia	Added ammonia to 303(d) List in 2004.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/21/2000 – 01/24/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Inflow MGALV-A 101040	AGFD Ambient	2 total and 3 dissolved: Cadmium, chromium, copper, lead, manganese, mercury and zinc 2 total and 0-2 dissolved metals: Antimony, arsenic, beryllium, boron, lead, and selenium	11-21 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	2 Fluoride 12 Total dissolved solids 6 Turbidity
Boat ramp MCALV-BR 102752	AGFD Ambient			
Mid lake MGALV-C 101042	AGFD Ambient			
Combined site A, B, C MCALV-ABC 101053	AGFD Ambient			
East basin MGALV-EAST 102562	AGFD Ambient			
West lagoon MBALV-WEST 102563	AGFD Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Ammonia	0.29 mg/L at 24.8 C, 8.9 SU 0.32 mg/L at 28.1 C, 8.7 SU 0.74 mg/L at 21.6 C, 8.3 SU A&Ww chronic	05/09/2001 – 0.33 mg/L 09/17/2002 – 1.09 mg/L 05/01/2003 – 1.33 mg/L	Remains impaired –3 exceedances during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient *E. coli* bacteria and mercury to assess FBC and FC		Lab detection limit for dissolved mercury is higher than A&W chronic criteria.
MONITORING RECOMMENDATIONS		High Priority – Collect ammonia samples to support development of ammonia TMDL. High ammonia may be a symptom of excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Use lower lab detection limit for dissolved mercury. Collect missing core parameters to represent at least 3 seasons during the assessment period.	

ARNETT CREEK From headwaters to Queen Creek 15050100 – 1818 11.1 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining	Category 1 Attaining	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 12/19/2001 – 08/03/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Blue Springs MGARN007.64 103462	Resolution Copper Ambient	4-8 total and dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, and zinc 4-8 total and 0-2 dissolved: Boron, lead, mercury, silver	4-6 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	6 *E. coli* bacteria 6 Fluoride 6 Total dissolved solids 6 Turbidity 1 Cyanide
Near Superior, AZ MCARN002.74 101306	ADEQ Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	08/26/2002 – 5.3 mg/L 05/07/2002 – 3.4 mg/L	Attaining – Low dissolved oxygen due to groundwater upwelling and low flow. (Flow 0.01 cfs)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Use lower lab detection limits for selenium and dissolved mercury.	

BLUE JOHN WASH From headwaters to unnamed tributary of Lynx Creek 15070102 -- 471 1.0 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&We – Inconclusive PBC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 05/11/2001		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Upstream of unnamed tributary to Lynx Creek (Sheldon Mine wash) MGBLJ000.06 103409	Weston Inc Special inv for EPA	1 dissolved metal sample: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, manganese, mercury, nickel, silver, thallium, and zinc	None	1 Fluoride 1 Total dissolved solids

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Zinc (dissolved)	3,599.4 µg/L at >400 mg/L hardness A&Wc acute	05/11/2001 – 5060 µg/L	Inconclusive – Only 1 exceedance.

Pollutant: Assume "total" concentration, unless shown as dissolved.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Zinc	Insufficient core parameters	Insufficient monitoring events	Lab detection limits for selenium and dissolved mercury were higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority –Collect additional zinc data due to the exceedance. Use lower lab detection limits for selenium and dissolved mercury. Collect core parameters to represent at least 3 seasons during an assessment period. (See also "Unnamed tributary to Lynx Creek" assessment)	

CASH MINE CREEK From headwaters to Hassayampa River 15070103 -- 349 1 Mile	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Inconclusive FC – Inconclusive	Category 4A Not attaining	Cadmium, copper, zinc	The Hassayampa River TMDL included loadings for cadmium, copper, and zinc from this tributary.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 05/10/2001; 03/04/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near McCleur Tailings MGCSM000.34 102818	ADEQ TMDL and Westin, Inc Special Inv.	2 total and 3 dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, silver, and zinc 2 total and -0-2 dissolved: Barium, boron, manganese , mercury	2 Dissolved oxygen 2 pH	1 Fluoride 1 Total dissolved solids
Below road MGCSM000.29 100833	ADEQ TMDL			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Copper (dissolved)	21.5 µg/L at 165 mg/L hardness 9.2 µg/L at 67 mg/L hardness A&Wc acute	05/10/2001 – 2820 µg/L 03/04/2005 – 1700 µg/L	Remains impaired – 2 exceedances in last 3 years of monitoring. Also considered the magnitude of the values and the mining sources in the area.
pH	<6.5 SU A&Wc, FBC	03/04/2005 – 5.8 µg/L	Inconclusive – 1 of 2 samples did not meet the criteria (binomial).
Lead (dissolved)	4.7 µg/L at 165 mg/L hardness A&Wc chronic	05/10/2001 – 7.1 µg/L	Inconclusive – 1 exceedance during the assessment period.
Zinc (dissolved)	193 µg/L at 165 mg/L hardness 83.5 µg/L at 67 mg/L hardness A&Wc acute	05/10/2001 – 256 µg/L 03/04/2005 – 120 µg/L	Remains impaired – 2 exceedances in the last 3 years of monitoring.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Lead and pH	Insufficient dissolved oxygen, *E. coli* bacteria, and mercury to assess A&Wc, FBC, and FC.	Insufficient monitoring events	Lab detection limits for selenium and dissolved mercury were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority –Collect cadmium, copper, zinc, and pH data to evaluate the effectiveness of TMDL implementation strategies after they have been implemented. Samples collected should represent critical conditions – conditions in which exceedances are most likely to occur. Collect additional lead samples due to the exceedance. Collect additional core parameters to represent at least 3 seasons. Use lower lab detection limits for selenium and dissolved mercury.	

UNNAMED TRIBUTARY TO CASH MINE CREEK From headwaters to Cash Mine Creek 15070103 -- 415 1 Mile	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Inconclusive FC – Inconclusive	Category 4A Not attaining	Cadmium, copper, zinc	The 2002 Hassayampa River TMDL included loadings for cadmium, copper, and zinc from this tributary.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 05/10/2001; and 03/04/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above adit & McCleur tailings MGUCM000.27 103357	Westin, Inc Special Inv.	4-5 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, manganese, nickel, silver, thallium, and zinc 1 total and dissolved: Boron 1 Selenium (Only 2 sampling events)	2 Dissolved oxygen 2 pH	4 Fluoride 4 Total dissolved solids
At adit & above McCleur tailings MGUCM000.25 103358	Westin, Inc Special Inv.			
Below adit & above McCleur tailings MGUCM000.22 103359	Westin, Inc Special Inv.			
Above McCleur tailings MGUCM000.13 102816	ADEQ TMDL			
At base of McCleur tailings MGUCM000.09 103352	Westin, Inc Special Inv.			
Below McCleur tailings MGUCM000.01 102817	ADEQ TMDL			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Beryllium	5.3 µg/L A&Wc chronic	05/10/2001 – 6.2 µg/L	Inconclusive – Only 1 exceedance in the last 3 years of monitoring.
Cadmium (dissolved)	5.7 µg/L at 130 mg/L hardness 2.9 µg/L at 70 mg/L hardness A&Wc acute	05/10/2001 – 82.1 µg/L 03/04/2005 – 13.0 µg/L	Remains impaired – 2 exceedances in the last 3 years of monitoring.
Copper (dissolved)	17.2 µg/L at 130 mg/L hardness 9.6 µg/L at 70 mg/L hardness A&Wc acute	05/10/2001 – 1080 µg/L 03/04/2005 – 150 µg/L	Remains impaired – 2 exceedances in last 3 years of monitoring.
Lead	15 µg/L FBC	05/10/2001 – 60.6 µg/L	Inconclusive – Only 1 exceedance in 2 samples. (Binomial)
Lead (dissolved)	3.3 µg/L at 130 mg/L hardness A&Wc chronic	05/10/2001 – 60.6 µg/L	Inconclusive – Only 1 exceedance in the last 3 years of monitoring.
pH	<6.5 SU A&Wc, FBC	03/04/2005 – 5.4 SU	Inconclusive –Did not meet standard when measured – only 1 measurement taken. (Binomial)
Selenium	2.0 µg/L A&Wc chronic	05/10/2001 – 3.7 µg/L	Inconclusive – Exceeded in only 1 sample during the last 3 years of monitoring.
Zinc (dissolved)	156 µg/L at 130 mg/L hardness 86.6 µg/L at 70 mg/L hardness A&Wc acute	05/10/2001 – 7590 µg/L 03/04/2005 – 1400 µg/L	Remains impaired – 2 exceedances in the last 3 years of monitoring.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	**MISSING CORE PARAMETERS**	**MISSING SEASONAL DISTRIBUTION**	**DETECTION LIMITS NOT LOW ENOUGH**
Beryllium, lead, pH, and selenium	Insufficient dissolved oxygen and *E. coli* bacteria to assess attainment of A&W or FBC.	Insufficient monitoring events	Lab detection limits for selenium and dissolved mercury were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority –Collect additional cadmium, copper, zinc, and pH data to evaluate the effectiveness of TMDL implementation strategies after they have been implemented. Collect these samples during critical conditions – when exceedances are most likely to occur. Collect additional beryllium, lead, and selenium samples due to exceedances. Collect additional core parameters to represent at least 3 seasons. Use lower lab detection limits for selenium and dissolved mercury.	

CAVE CREEK	USE SUPPORT	OVERALL ASSESSMENT	
From headwaters to Cave Creek Dam 15060106B– 026A 32.9 Miles	A&Ww – Attaining FBC – Attaining FC – Attaining AgL – Attaining	Category 1 Attaining	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 12/17/2001 – 02/05/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Seven Springs MGCVE037.68 100527	ADEQ Ambient	5-8 total and dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, and zinc 4-8 total and 0-2 dissolved: Boron, lead, manganese, mercury	8 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	8 *E. coli* bacteria 8 Fluoride 8 Total dissolved solids 1 Suspended sediment concentration 8 Turbidity
Below Maricopa Mine tailings MCCVE025.98 101305	ADEQ Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limit for selenium was higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Use lower lab detection limits for selenium.	

CHAPARRAL PARK LAKE 15060106B – 0300 12 Acres	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired PBC – Impaired FC – Inconclusive AgI – Inconclusive	Category 5 Impaired	*E. coli* bacteria and low dissolved oxygen	*E. coli* bacteria and low dissolved oxygen were added to 303(d) list in 2004.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 05/09/2001 – 10/31/2003 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam MGCHA-A 101045	ADEQ Ambient	2 total and 3 dissolved: Barium, cadmium, chromium, copper, lead, manganese, mercury, nickel, zinc 2 total and 0-2 dissolved: Antimony, arsenic, beryllium, boron, selenium, and silver	7 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	2 Fluoride 5 Total dissolved solids 1 Turbidity
Mid Lake MGCHA-B 101046	ADEQ Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient dissolved oxygen, *E. coli* bacteria, manganese, boron and mercury to assess uses.		Lab detection limit for dissolved mercury was higher than A&Ww chronic criteria.
DISSOLVED OXYGEN AND PH IMPAIRMENT		Insufficient data to affect impairment decisions. No bacteria data. Delisting dissolved oxygen would require at least 10 samples, some of which were collected during critical conditions.	
MONITORING RECOMMENDATIONS		High Priority – Collect dissolved oxygen and *E. coli* bacteria to support development of TMDLs. Low dissolved oxygen may be an indication of excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for dissolved mercury.	

CORTEZ PARK LAKE 15060106B – 0410 2 Acres	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired PBC – Impaired FC – Inconclusive AgI – Impaired	Category 5 Impaired	High pH and low dissolved oxygen	High pH and low dissolved oxygen were added to 303(d) list in 2004.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 05/14/2001 – 09/24/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam MGCOR - A 101043	ADEQ Ambient	2 total and 2 dissolved: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, zinc	3 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	2 *E. coli* bacteria 2 Fluoride 2 Total dissolved solids 2 Turbidity
Mid Lake MGCOR - B 101044	AGFD Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events	Lab detection limit for dissolved mercury was higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		High Priority – Collect dissolved oxygen and pH samples to support development of TMDLs. Low dissolved oxygen and high pH may be symptoms of excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for dissolved mercury.	

ENCANTO PARK LAKE 15060106B– 0510 8 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive PBC – Inconclusive FC – Inconclusive Agl – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 07/23/2002 – 10/01/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid lake MGENC - B 102757	ADEQ Ambient	1dissolved only: Cadmium, chromium, copper, lead, manganese, mercury, and zinc	2 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen	2 Total dissolved solids

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters	Insufficient sampling events	Lab detection limits for selenium and dissolved mercury were higher than A&Ww.
MONITORING RECOMMENDATIONS		Low Priority – Collect missing core parameters to represent at least 3 seasons during the assessment period. Use lower lab detection limits for selenium and dissolved mercury.	

FAIN LAKE (on Lynx Creek) 15070101 -- 0005 10 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Attaining FC – Inconclusive	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 08/29/2002 – 06/09/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam MGFAI-A 101400	ADEQ Ambient	2 total and 2 dissolved: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, and zinc	2-3 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	3 *E. coli* bacteria 2 Fluoride 3 Total dissolved solids 2 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	08/29/2002 – 4.3	Inconclusive – Only 1 exceedance in 3 sampling events (binomial).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Dissolved oxygen	Insufficient dissolved copper, cadmium, mercury, and zinc to assess A&Ww and FC.	Samples only represent 1 season (June and August).	Lab detection limit for dissolved mercury was higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority – Collect dissolved oxygen data because criterion was not met. Low dissolved oxygen may be a symptom of excess nutrient loading. New methods for implementing the narrative nutrient standard should be applied to this lake once adopted, to determine whether narrative nutrient violations are occurring. Collect missing core parameters to represent at least 3 seasons during the assessment period. Use lower lab detection limits for dissolved mercury.	

FRENCH GULCH From headwaters to Hassayampa River 15070103 -- 239 9.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired FBC – Inconclusive FC – Attaining	Category 4A Not attaining	Cadmium, copper, and zinc	TMDL completed and approved in 2005 for cadmium, copper, and zinc

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/29/2001 – 04/03/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below headwaters MGFRG010.33 102234	ADEQ TMDL	36-45 total and dissolved: Cadmium, chromium, copper, and zinc 43 total and 4 dissolved: Manganese 36-38 total and 0-2 dissolved: Arsenic, boron, lead, mercury 3 total and dissolved: Beryllium 38 pH	19 Dissolved oxygen	None
Western trib above Zonia Mine MGFRG010.19 102085	ADEQ TMDL			
Above Zonia Mine MGFRG010.14 102088	ADEQ TMDL			
At headwaters MGFRG010.13 102086	ADEQ TMDL			
Above Zonia Mine MGFRG009.79 101619	ADEQ TMDL			
Below upper waste rock pile MGFRG009.59 102087	ADEQ TMDL			
Above Zonia Gulch MGFRG008.19 102235	ADEQ TMDL			
Below Zonia Gulch MGFRG008.09 101620	ADEQ TMDL			
Above Placerita Gulch MGFRG007.28 102242	ADEQ TMDL			
Above Placerita Gulch MGFRG007.06 101649	ADEQ TMDL			
Below Placerita Gulch MGFRG0006.95 101650	ADEQ TMDL			
Above Hassayampa River MGFRG000.19 102084	ADEQ TMDL			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Arsenic	50 µg/L FBC	11/12/2003 – 78 µg/L	Attaining – Only 1 exceedance in38 samples (binomial).
Cadmium (dissolved)	6.2 µg/L at >400 mg/L hardness A&Ww chronic	03/29/2001 – 9 mg/L 04/24/2001 – 8 mg/L 06/06/2001 – 9 mg/L	Remains impaired –3 exceedances of the chronic criteria during 3 consecutive months.
Copper	1300 µg/L – FBC	08/28/2003 – 2000 µg/L 11/12/2003 – 5500 µg/L	Attaining – Only 2 exceedances in 18 samples (binomial).
Copper (dissolved)	49.6 µg/L at >400 mg/L hardness 49.6 µg/L at >400 mg/L hardness 25.8 µg/L at 190 mg/L hardness 49.6 µg/L at >400 mg/L hardness 49.6 µg/L at >400 mg/L hardness 18.4 µg/L at 140 mg/L hardness 3.6 µg/L at 23 mg/L hardness 3.9 µg/L at 30 mg/L hardness 3.3 µg/L at 22 mg/L hardness 3.7 µg/L at 26 mg/L hardness A&Ww acute	03/29/2001 – 75 µg/L 04/24/2001 – 56 µg/L 02/26/2003 – 140 µg/L 03/04/2003 – 65 µg/L 08/28/2003 – 120 µg/L 11/12/2003 – 190 µg/L 12/26/2003 – 31 µg/L 02/23/2004 – 78 µg/L 03/13/2004 – 18 µg/L 04/03/2004 – 9.7 µg/L	Remains impaired – 10 exceedances total. 8 exceedances in the last 3 years of monitoring.
Dissolved oxygen	6.0 mg/L A&Ww	02/26/2003 – 5.1 mg/L 08/27/2003 – 5.2 mg/L	Attaining – One low dissolved oxygen value was due to low flow and ground water upwelling; therefore, only 1 sample did not meet criteria in 10 sampling events (binomial).
Lead	15 µg/L FBC	08/25/2003 – 90.2 µg/L 11/12/2005 – 340 µg/L	Attaining – Only 2 of 13 sampling events with an exceedance. (binomial)
Zinc (dissolved)	379 µg/L at >400 mg/L hardness 379 µg/L at >400 mg/L hardness A&Ww acute	06/06/2001 – 460 µg/L 10/11/2001 – 400 µg/L	Attaining – Although 2 exceedances in 2001, no exceedances in the last 3 years of monitoring. Note that ground water is being pumped and treated at Zonia Mine during this period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient *E. coli* bacteria to assess FBC		Lab detection limits for dissolved metals (cadmium, copper, and zinc) were higher than A&W chronic criteria in at least 9 samples.
MONITORING RECOMMENDATIONS		Medium Priority –Collect cadmium, copper, and zinc samples to determine effectiveness of TMDL implementation strategies, once implemented. Collect samples during critical conditions – when exceedances are most likely to occur. Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower detection limits for dissolved metals.	

GILA RIVER From Dripping Springs Wash to San Pedro River 15050100 – 009 11.0 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 11/18/2002 – 05/21/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Dripping Springs Wash MGGLR343.27 101652	ADEQ Ambient	4 total and dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, and zinc 4 total metals only: Boron, lead, manganese, mercury, nickel	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Suspended sediment concentration 4 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limit for selenium was higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Use lower lab detection limit for selenium.	

GILA RIVER From San Pedro River to Mineral Creek 15050100 – 008 19.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Ww – Impaired FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 5 Impaired	Suspended sediment	Add suspended sediment to the 303(d) List.

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 09/12/2001 – 08/10/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Kelvin USGS #09474000 MGGLR313.73 100748	USGS Ambient	12-13 total and dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc	12-13 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	13 *E. coli* bacteria 13 Fluoride 13 Total dissolved solids 13 Suspended sediment concentration 12 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
E. coli bacteria	235 CFU/100 ml FBC	08/10/2004 – 300 CFU/100 ml	Inconclusive – Only one exceedance in past 3 years of data (1 of 13 samples).
Lead	15 µg/L FBC	09/09/2003 – 29 µg/L 08/10/2004 – 22.9 µg/L	Attaining – Only 2 exceedance in 13 samples. (Binomial)
Suspended sediment concentration (SSC)	Geometric mean 80 mg/L A&Ww	12/05/2001 – 141 mg/L – 240 cfs 08/21/2002 – 173 mg/L – 8 cfs 03/26/2003 – 915 mg/L – 408 cfs* 09/09/2003 – 658 mg/L – 3.2 cfs 12/08/2003 – 161 mg/L – 0.2 cfs 03/23/2004 – 182 mg/L – 285 cfs 08/10/2004 – 956 mg/L – 31 cfs	Impaired – 7 of 13 samples exceeded the 80 mg/L criterion. One of the exceedances (*) was not included in the geometric mean calculation because the flow was above the 50th Percentile of flow (300 cfs). Using the remaining samples, the geometric mean exceeded 80 mg/L three times.
Selenium	2.0 µg/L A&Ww chronic	06/23/2003 – 3.0 mg/L	Inconclusive – Selenium exceeded the standard 1 time during the last 3 years of monitoring. Note exceedance occurred during low flow (0.2 cfs).

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
E. coli bacteria and selenium	Collected all core parameters		Lab detection limit for dissolved mercury was higher than A&Wc chronic criteria.
MONITORING RECOMMENDATIONS		High Priority –Collect additional suspended sediment concentration data to support development of a TMDL. The old turbidity standard (50 NTU) was exceeded in 6 of 12 samples. Recommend using biocriteria assessments and bottom deposits implementation procedures in this reach, when they are adopted. Collect additional selenium and *E. coli* bacteria samples due to exceedances. Use a lower lab detection limit for dissolved mercury.	

GILA RIVER From Salt River to Agua Fria River 15070101 -- 015 3.7 Miles	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Wedw – Attaining PBC – Attaining FC – Inconclusive AgI – Attaining AgL -- Attaining	Category 2 Attaining some uses		
	EPA	FC – Impaired	Category 5 Impaired	DDT, toxaphene, and chlordane in fish tissue.	DDT, toxaphene, and chlordane were listed by EPA in 2002.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 11/20/2001 – 08/09/2002 NUMBER AND TYPES OF SAMPLES Metals	Nutrients – Related	Other
Above El Mirage Road MGGLR204.04 101264	ADEQ Ambient	4 total and dissolved: Antimony, arsenic, beryllium, cadmium, chromium, copper, zinc 4 total metals only: Boron, lead, manganese, mercury	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	4 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Turbidity 2 Chlorine

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			Fish consumption advisory due to DDT, toxaphene, and chlordane in fish tissue

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Pesticides in fish tissue	Collected all core parameters		Lab detection limit for selenium was higher than A&Wedw chronic criteria.
DISCUSSION OF PESTICIDE IMPAIRMENT		Evidence of potential pesticide impairment: • A risk assessment completed in 2006 indicates that the fish consumption advisory for these pesticides should remain in effect. • A fish consumption advisory issued in 1991 remains in effect.	
MONITORING RECOMMENDATIONS		High Priority – Collect pesticides samples in fish tissue and water column to support development of TMDLs. Use a lower lab detection limit for selenium.	

GILA RIVER From Agua Fria River to Waterman Wash 15070101 -- 014 11.9 Miles	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Wedw – Inconclusive PBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive		
	EPA	FC – Impaired	Category 5 Impaired	DDT, toxaphene, and chlordane in fish tissue.	DDT, toxaphene, and chlordane were listed by EPA in 2002.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 1/12/2005, 1/21/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Estrella Parkway MGGLR199.33 101495	ADEQ Ambient	2 total and 2 dissolved: Antimony, arsenic, beryllium, cadmium, copper, lead, manganese, mercury, and zinc 2 total metals only: Boron and chromium	2 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	2 *E. coli* bacteria 2 Fluoride 2 Total dissolved solids 2 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			Fish consumption advisory due to DDT, toxaphene, and chlordane in fish tissue

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Pesticides in fish tissue	Insufficient core parameters to assess designated uses	Insufficient monitoring events	Lab detection limits for dissolved mercury, dissolved lead, and total selenium were higher than A&Wedw chronic criteria.
DISCUSSION OF PESTICIDE IMPAIRMENT		Evidence of potential pesticide impairment: • A risk assessment completed in 2006 indicates that the fish consumption advisory for these pesticides should remain in effect. • A fish consumption advisory issued in 1991 remains in effect.	
MONITORING RECOMMENDATIONS		High Priority – Collect pesticides to support development of TMDL development. Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for selenium, dissolved lead, and dissolved mercury.	

GILA RIVER From Waterman Wash to Hassayampa River 15070101 -- 010 13.9 Miles	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Wedw – Inconclusive PBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive		
	EPA	FC – Impaired	Category 5 Impaired	DDT, toxaphene, and chlordane in fish tissue.	DDT, toxaphene, and chlordane were listed by EPA in 2002.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT			
No Current Data			Fish consumption advisory due to DDT, toxaphene, and chlordane in fish tissue

DATA GAPS AND MONITORING NEEDS	
DISCUSSION OF PESTICIDE IMPAIRMENT	Evidence of potential pesticide impairment: • A risk assessment completed in 2006 indicates that the fish consumption advisory for these pesticides should remain in effect. • A fish consumption advisory issued in 1991 remains in effect.
MONITORING RECOMMENDATIONS	High Priority – Collect samples to support pesticide TMDL development.

GILA RIVER From Hassayampa River to Centennial Wash 15070101 -- 009 7 Miles	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Wedw – Inconclusive PBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive		
	EPA	FC – Impaired	Category 5 Impaired	DDT, toxaphene, and chlordane in fish tissue.	DDT, toxaphene, and chlordane were listed by EPA in 2002.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT			
No Current Data			Fish consumption advisory due to DDT, toxaphene, and chlordane in fish tissue

DATA GAPS AND MONITORING NEEDS	
DISCUSSION OF PESTICIDE IMPAIRMENT	Evidence of potential pesticide impairment: • A risk assessment completed in 2006 indicates that the fish consumption advisory for these pesticides should remain in effect. • A fish consumption advisory issued in 1991 remains in effect.
MONITORING RECOMMENDATIONS	High Priority – Collect samples to support pesticide TMDL development.

GILA RIVER From Centennial Wash to Gillespie Dam 15070101 -- 008 5.3 Miles	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Wedw – Impaired PBC – Inconclusive FC – Attaining AgI – Impaired AgL – Attaining	Category 5 Impaired	Boron and selenium in the water column	Boron on list since 1992. Selenium was added in 2004
	EPA	FC – Impaired	Category 5 Impaired	DDT, toxaphene, and chlordane in fish tissue.	DDT, toxaphene, and chlordane were listed by EPA in 2002.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 03/28/2000 – 05/19/2004 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Above diversion at Gillespie Dam USGS #09518000 MGGLR167.44 100734	USGS Ambient	18 total and dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc	18 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	18 *E. coli* bacteria 18 Fluoride 18 Total dissolved solids 18 Suspended sediment concentration 18 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Boron	1000 µg/L AgI	ALL 18 SAMPLES EXCEEDED Concentrations ranged from 1700 µg/L to 3080 µg/L	Remains impaired – 18 exceedances in 18 samples.
			Fish consumption advisory due to DDT, toxaphene, and chlordane in fish tissue
E. coli bacteria	576 CFU/100 ml PBC	03/27/2003 -- >2675 CFU/100 ml	Inconclusive – 1 exceedance in the last 3 years of monitoring
Selenium	2.0 µg/L A&Wedw	14 exceedances (Too many to display) Concentrations ranged from <1 to 18 µg/L	Remains impaired – 14 of 18 samples exceeded the criterion. 8 of the measurements were 5.0 µg/L or higher.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
E. coli bacteria, pesticides in fish tissue	Collected all core parameters		
DISCUSSION OF PESTICIDE IMPAIRMENT		Evidence of potential pesticide impairment: • A risk assessment completed in 2006 indicates that the fish consumption advisory for these pesticides should remain in effect. • A fish consumption advisory issued in 1991 remains in effect.	
MONITORING RECOMMENDATIONS		High Priority – Collect samples to support development of TMDLs for pesticides, boron, and selenium. Collect *E. coli* bacteria due to the exceedance.	

GILA RIVER From Gillespie Dam to Rainbow Wash 15070101 -- 007 5.1 Miles	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Wedw – Inconclusive PBC – Inconclusive FC – Inconclusive AgI -- Inconclusive AgL – Inconclusive	Category 3 Inconclusive		
	EPA	FC – Impaired	Category 5 Impaired	DDT, toxaphene, and chlordane in fish tissue.	DDT, toxaphene, and chlordane were listed by EPA in 2002.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT			
No Current Data			Fish consumption advisory due to DDT, toxaphene, and chlordane in fish tissue

DATA GAPS AND MONITORING NEEDS	
DISCUSSION OF PESTICIDE IMPAIRMENT	Evidence of potential pesticide impairment: • A risk assessment completed in 2006 indicates that the fish consumption advisory for these pesticides should remain in effect. • A fish consumption advisory issued in 1991 remains in effect.
MONITORING RECOMMENDATIONS	High Priority – Collect samples to support pesticide TMDL development.

GILA RIVER From Rainbow Wash to Sand Tank 15070101 -- 005 16.9 Miles	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Wedw – Inconclusive PBC – Inconclusive FC – Inconclusive AgI -- Inconclusive AgL – Inconclusive	Category 3 Inconclusive		
	EPA	FC – Impaired	Category 5 Impaired	DDT, toxaphene, and chlordane in fish tissue.	DDT, toxaphene, and chlordane were listed by EPA in 2002.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT			
No Current Data			Fish consumption advisory due to DDT, toxaphene, and chlordane in fish tissue

DATA GAPS AND MONITORING NEEDS	
DISCUSSION OF PESTICIDE IMPAIRMENT	Evidence of potential pesticide impairment: • A risk assessment completed in 2006 indicates that the fish consumption advisory for these pesticides should remain in effect. • A fish consumption advisory issued in 1991 remains in effect.
MONITORING RECOMMENDATIONS	High Priority – Collect samples to support pesticide TMDL development.

GILA RIVER From Sand Tank to Painted Rocks Reservoir 15070101 -- 001 18.7 Miles	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	ADEQ	A&Wedw – Inconclusive PBC – Inconclusive FC – Inconclusive AgI – Inconclusive AgL – Inconclusive	Category 3 Inconclusive		
	EPA	FC – Impaired	Category 5 Impaired	DDT, toxaphene, and chlordane in fish tissue.	DDT, toxaphene, and chlordane were listed by EPA in 2002.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT			
No Current Data			Fish consumption advisory due to DDT, toxaphene, and chlordane in fish tissue

DATA GAPS AND MONITORING NEEDS	
DISCUSSION OF PESTICIDE IMPAIRMENT	Evidence of potential pesticide impairment: • A risk assessment completed in 2006 indicates that the fish consumption advisory for these pesticides should remain in effect. • A fish consumption advisory issued in 1991 remains in effect.
MONITORING RECOMMENDATIONS	High Priority – Collect samples to support pesticide TMDL development.

HASSAYAMPA LAKE 15070103 -- 3160 2 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Inconclusive FBC – Inconclusive FC – Inconclusive DWS – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATE: 05/08/2001 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Inlet MGHAS - C 103432	Westin, Inc Special Inv.	1 total and dissolved metals: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, and zinc 1 total metals only: Mercury	None	1 Fluoride 1 Total dissolved solids

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Copper (dissolved)	9.6 µg/L at 70 mg/L hardness A&Wc acute	05/08/2001 – 14.4 µg/L	Inconclusive – 1 exceedance in a 3-year period
Lead	15 µg/L FBC	05/08/2001 – 25 µg/L	Inconclusive – Only sample exceeded the criteria.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Copper and lead	Insufficient core parameters	Insufficient monitoring events.	Lab detection limits for selenium, and dissolved mercury were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority –Collect additional copper and lead data due to the exceedances. Collect additional core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for selenium, thallium, and dissolved mercury.	

HASSAYAMPA RIVER From headwaters to Copper Creek 15070103 – 007A 11.0 Miles	USE SUPPORT	OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A&Wc – Impaired FBC – Impaired FC – Attaining AgI – Impaired AgL – Impaired	Category 5 (pH) Impaired Category 4A (Cadmium, copper, zinc) Not Attaining	Cadmium, copper, zinc, and pH	Add pH. TMDL completed and approved in 2002 for cadmium, copper, and zinc

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 09/27/2000 - 05/10/2001; 03/04/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Headwaters MGHSR115.34 101151	ADEQ TMDL	58-69 total and dissolved: Cadmium, copper, and zinc 3-7 total and dissolved: Antimony, arsenic, barium, beryllium, chromium, manganese, nickel, silver 1-2 total and 0-2 dissolved: Boron, selenium, thallium 6 total and 2 dissolved (2 dates): Mercury	62 pH 41 Dissolved oxygen 8 Nitrite/nitrogen 8 Total nitrogen 1 Total phosphorus	7 Fluoride 7 Total dissolved solids
Downstream of spring MGHSR114.54 101005	ADEQ TMDL			
Upstream of Wetland Mine MGHSR113.96 103435	Westin, Inc Special inv.			
At Wetland Mine MGHSR113.91 103436	Westin, Inc Special inv.			
Below Wetland Mine - Babble MGHSR113.86 100942	ADEQ TMDL			
Above Hassayampa Lake MGHSR113.60 103431	Westin, Inc Special inv.			
Above McCleur Mine tributary MGHSR113.17 101067	ADEQ TMDL			
At McCleur Mine tributary MGHSR 113.16 101066	ADEQ TMDL			
Below McCleur Mine tributary MGHSR113.15 101065	ADEQ TMDL			
Above Senator Mine MGHSR113.09 100465	ADEQ and Westin Special inv.			
At Senator Mine MGHSR113.01 101084	ADEQ TMDL			
Below Senator Mine MGHSR112.97 103355	Westin, Inc Special inv.			
Further below Senator Mine MGHSR112.91 100466	ADEQ TMDL			
At Whisper MGHSR111.40 100941	ADEQ TMDL			
At Jersey MGHSR108.19 101195	ADEQ TMDL			

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Cadmium	50 µg/L – AgI, AgL 84 µg/L – FC	03/23/2001 – 157 µg/L 04/16/2001 – 56 µg/L	Attaining – Only 2 exceedances of the 50 µg/L criterion and only 1 exceedance of the 84 µg/L criterion in 12 samples (binomial)
Cadmium (dissolved)	14.1 µg/L at 322 mg/L hardness 13.2 µg/L at 284 mg/L hardness 13.7 µg/L at 294 mg/L hardness 19.1 µg/L at >400 mg/L hardness 7.1 µg/L at 161 mg/L hardness 19.1 µg/L at >400 mg/L hardness 19.1 µg/L at >400 mg/L hardness 19.1 µg/L at >400 mg/L hardness 19.1 µg/L at >400 mg/L hardness 19.1 µg/L at >400 mg/L hardness A&Wc acute	11/07/2000 – 28 µg/L 01/10/2001 – 35 µg/L 02/13/2001 – 37 µg/L 03/23/2001 – 161 µg/L 04/10/2001 – 23 µg/L 04/17/2001 – 52 µg/L 05/10/2001 – 22.9 µg/L 06/07/2001 – 45 µg/L 08/07/2001 – 38 µg/L 01/28/2002 – 28 µg/L	Remains impaired – 10 exceedances during the last 3 years of monitoring.
Copper	500 µg/L – AgL 1300 µg/L – FBC	01/10/2001 – 2455 µg/L 02/13/2001 – 2832 µg/L 03/23/2001 – 1670 µg/L 04/10/2001 – 2147 µg/L 06/07/2001 – 2062 µg/L 08/07/2001 – 1747 µg/L	Remains impaired – In 6 of 13 sampling events, the criteria were exceeded (binomial).
Copper (dissolved)	40.4 µg/L at 322 mg/L hardness 35.9 µg/L at 284 mg/L hardness 37.1 µg/L at 294 mg/L hardness 12.2 µg/L at 90 mg/L hardness 21.0 µg/L at 161 mg/L hardness 49.6 µg/L at >400 mg/L hardness 49.6 µg/L at >400 mg/L hardness 19.1 µg/L at >400 mg/L hardness 19.1 µg/L at >400 mg/L hardness A&Wc acute	11/07/2000 – 4077 µg/L 01/10/2001 – 2504 µg/L 02/13/2001 – 2830 µg/L 03/23/2001 – 1520 µg/L 04/10/2001 – 2174 µg/L 04/17/2001 – 110 µg/L 05/10/2001 – 112 µg/L 06/07/2001 – 1994 µg/L 08/07/2001 – 1730 µg/L	Remains impaired – 9 exceedances in the last 3 years monitored (13 sampling events).
Dissolved oxygen	6.0 mg/L A&Wc	09/27/2000 – 5.1 mg/L 11/07/2000 – 6.5 mg/L 03/23/2001 – 4.9 mg/L	Attaining – Low dissolved oxygen is due to naturally occurring conditions of low flow and ground water upwelling.
Lead	15 µg/L FBC	06/07/2001 – 16 µg/L	Inconclusive – Only 1 exceedance in 4 samples. (Binomial) Exceedance was only marginally over the criterion.
pH	<6.5 SU A&Wc, FBC, AgI, AgL	11/07/2000 – 3.4 SU 1/10/2001 – 3.6 SU 02/13/2001 – 4.0 SU 03/23/2001 – 4.1 SU 04/10/2001 – 3.8 SU 06/07/2001 – 3.4 SU 08/07/2001 – 3.9 SU	Impaired – Exceeded criterion in 21 of 59 samples (during 7 of 13 sampling events) (Binomial)
Selenium	2.0 µg/L A&Wc chronic	05/09/2001 – 3.6 SU	Inconclusive – Exceeded criterion only once during the assessment period. Lab reporting limit was higher than criterion for all other analyses.
Zinc	10,000 µg/L AgI	03/23/2001 – 15,300 µg/L	Attaining – Only 1 exceedance in 13 sampling events. (Binomial)
Zinc (dissolved)	291 µg/L at 293 mg/L hardness 332 µg/L at 342 mg/L hardness 316 µg/L at 322 mg/L hardness 379 µg/L at >400 mg/L hardness 379 µg/L at >400 mg/L hardness 379 µg/L at >400 mg/L hardness 175 µg/L at 161 mg/L hardness 379 µg/L at >400 mg/L hardness 379 µg/L at >400 mg/L hardness 379 µg/L at >400 mg/L hardness 379 µg/L at >400 mg/L hardness 379 µg/L at >400 mg/L hardness	02/10/2000 – 770 µg/L 09/26/2000 – 510 µg/L 11/07/2000 – 2280 µg/L 01/10/2001 – 3160 µg/L 02/13/2001 – 3500 µg/L 03/23/2001 – 13000 µg/L 04/10/2001 – 2080 µg/L 04/17/2001 – 5040 µg/L 05/10/2001 – 2040 µg/L 06/07/2001 – 5120 µg/L 08/07/2001 – 4400 µg/L 01/28/2002 – 2680 µg/L	Remains impaired – Criteria were exceeded in 7 times during the last 3 years of monitoring (12 of 12 samples during the assessment period.)

	379 µg/L at >400 mg/L hardness A&Wc acute	03/04/2005 – 2400 µg/L	

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	**MISSING CORE PARAMETERS**	**MISSING SEASONAL DISTRIBUTION**	**DETECTION LIMITS NOT LOW ENOUGH**
Lead, and selenium	Insufficient *E. coli* bacteria and boron to assess FBC and AgI.		Lab detection limits for selenium and dissolved metals (cadmium, copper, mercury) were higher than A&Ww chronic criteria in at least 6 samples.
MONITORING RECOMMENDATIONS		Medium Priority – Actions to reduce cadmium, copper, and zinc loadings to the stream will also correct pH; therefore, TMDL development is a low priority. Collect cadmium, copper, zinc, and pH samples to determine effectiveness of TMDL implementation strategies, once implemented. Collect samples during critical conditions when exceedances are likely to occur. Collect additional lead and selenium samples due to exceedances. Collect missing core parameters to represent at least 3 seasons during an assessment period. Use lower lab detection limits for selenium and dissolved metals.	

HASSAYAMPA RIVER From Copper Creek to Blind Indian Creek 15070103 – 007B 20 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Attaining FC – Attaining AgI – Attaining AgL – Attaining	Category 1 Attaining all uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 02/02/2000 – 04/19/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Climax Mine MGHSR102.01 101196	ADEQ TMDL	8-42 total and dissolved: Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc 8-20 total and 0-1 dissolved: Boron, manganese	20-39 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, pH, and dissolved oxygen	18 *E. coli* bacteria 20 Fluoride 18 Total dissolved solids 10 Suspended sediment concentration 18 Turbidity
At intermittent site MGHSR095.83 101193	ADEQ TMDL			
At gaging station MGHSR092.07 100940	ADEQ TMDL			
Walnut Grove School MGHSR089.46 101004	ADEQ TMDL			
At Milk Creek MGHSR086.26 101128	ADEQ TMDL			
Below Milk Creek MGHSR085.79 100464	ADEQ Ambient			
At Blind Indian Creek MGHSR083.94 101003	ADEQ TMDL			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Copper (dissolved)	9.9 µg/L at 72 mg/L hardness A&Ww acute	11/06/2000 – 84 µg/L	Attaining – No exceedances in the last 3 years of monitoring.
Dissolved oxygen	6.0 mg/L A&Ww	02/02/2000 – 4.8 mg/L 09/08/2000 – 5.8 mg/L	Attaining – Low dissolved oxygen levels are due natural conditions and ground water upwelling.
E. coli bacteria	235 CFU/100 ml FBC	06/04/2001 – 530 CFU/100 ml	Attaining – No exceedances in the last 3 years of monitoring.
Zinc (dissolved)	88.7 µg/L at 72 mg/L hardness A&Ww acute	11/06/2000 – 190 µg/L	Attaining – No exceedances in the last 3 years of monitoring.

Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
E. coli bacteria	Collected all core parameters		Lab detection limits for selenium and dissolved metals (cadmium, mercury) were higher than A&Ww chronic criteria in at least 11 samples.
MONITORING RECOMMENDATIONS		Medium Priority – Collect *E. coli* bacteria samples due to exceedance. Use lower lab detection limit for selenium and dissolved metals.	

HASSAYAMPA RIVER From Cottonwood Creek to Martinez Wash 15070103 – 004 32.1 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Inconclusive FC – Attaining AgI – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 02/11/2000 – 04/19/2005 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At BLM gage, Box Canyon Dam MGHSR058.80 100463	ADEQ and USGS Ambient	16-24 total and dissolved: Antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, and zinc 8 total and dissolved: Barium, nickel, silver, thallium 8-20 total and 0-1 dissolved: Boron, manganese	21-22 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	21 *E. coli* bacteria 21 Fluoride 19 Total dissolved solids 11 Suspended sediment concentration 21 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
E. coli bacteria	235 CFU/100 ml FBC	02/17/2004 – 480 CFU/100 ml	Inconclusive – Only 1 exceedance in a 3 year period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
E. coli bacteria	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Ww chronic criteria in at least 12 samples.
MONITORING RECOMMENDATIONS		Medium Priority – Collect *E. coli* bacteria samples due to exceedance. Use lower lab detection limit for selenium and dissolved mercury.	

HASSAYAMPA RIVER From Sols Wash to 8 miles below Wickenburg 15070103 – 002A 9.2 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Attaining FBC – Inconclusive FC – Attaining AgL -- Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 10/18/2001 – 04/05/2002		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At Nature Conservancy MGHSR048.20 100462	ADEQ Ambient	3 total and dissolved: Antimony, arsenic, beryllium, cadmium, chromium, copper, zinc 3 total and 0-1 dissolved: Boron, lead, manganese, mercury 1 total and 1 dissolved: Barium, nickel, silver, thallium	3 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	3 *E. coli* bacteria 3 Fluoride 3 Total dissolved solids 3 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 µg/L A&Ww	10/18/2001 – 3.0 mg/L 01/17/2002 – 3.4 mg/L 04/05/2002 – 2.9 mg/L	Attaining – Low dissolved oxygen due to natural conditions of low flow and ground water upwelling. Flow at 0.1 cfs.
E. coli bacteria	235 CFU/100 ml FBC	04/05/2002 – 590 CFU/100 ml	Inconclusive – Only 1 exceedance in a 3 year period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
E. coli bacteria	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority – Collect *E. coli* bacteria samples due to exceedance. Use lower lab detection limit for selenium and dissolved mercury.	

HASSAYAMPA RIVER From Buckeye Canal to Gila River 15070103 – 001B 2.3 Miles	USE SUPPORT		OVERALL ASSESSMENT	POLLUTANTS CAUSING IMPAIRMENT	IMPAIRMENT STATUS
	A D E Q	A&Ww – Inconclusive FBC – Attaining FC – Attaining AgL – Attaining	Category 2 Attaining some uses		
	E P A	FC – Impaired	Category 5 Impaired	DDT, toxaphene, and chlordane in fish tissue.	DDT, toxaphene, and chlordane were listed by EPA in 2002.

Light blue highlights indicate EPA impairments based on EPA assessment and listing criteria. This listing may change when EPA reviews and approves the 2006/2008 impaired waters list. Such listings do not satisfy requirements established in ADEQ's Impaired Water Identification Rule; therefore, they are not included in the list of ADEQ's Impaired waters (Appendix B and Appendix C).

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 11/01/2001 – 09/20/2002 NUMBER AND TYPES OF SAMPLES Metals	Nutrients – Related	Other
Above Gila River MGHSR000.77 101197	ADEQ Ambient	4 total and dissolved: Antimony, arsenic, beryllium, cadmium, chromium, copper, zinc 4 total and 0-1 dissolved: Boron, lead, manganese, mercury 1 total and 0-1 dissolved: Barium, nickel, silver, selenium, thallium	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	3 *E. coli* bacteria 4 Fluoride 4 Total dissolved solids 4 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
			Fish consumption advisory due to DDT, toxaphene, and chlordane in fish tissue
Selenium	2.0 µg/L A&Ww chronic	11/01/2001 – 5.4 µg/L	Inconclusive – Only 1 exceedance during the assessment period. (Lab detection limit problems on other samples – see below.)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Selenium, pesticides in fish tissue	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Ww chronic criteria.
DISCUSSION OF PESTICIDE IMPAIRMENT		Evidence of potential pesticide impairment: • A risk assessment completed in 2006 indicates that the fish consumption advisory for these pesticides should remain in effect. • A fish consumption advisory issued in 1991 remains in effect.	
MONITORING RECOMMENDATIONS		High Priority – Collect pesticides to support development of pesticide TMDLs. Collect selenium samples due to exceedance. Use lower lab detection limit for selenium and dissolved mercury.	

INDIAN BEND WASH From headwaters to Salt River 15060106B -- 179 4.8 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&We – Inconclusive PBC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 01/12/2005 – 01/21/2005		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At 40th Street MGIBW014.04 101520	USGS Special study	4 total metals only: Cadmium, copper, lead, and zinc and mercury	4 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Lead	15 µg/L PBC	12/04/2001 – 25 µg/L 09/06/2002 – 38 µg/L 01/20/2003 – 25 µg/L	Inconclusive – 3 exceedances in 4 samples. (Binomial approach requires a minimum of 5 exceedances and 20 samples to assess as impaired.)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Lead	Insufficient dissolved cadmium, copper, zinc to assess A&We.		
MONITORING RECOMMENDATIONS		Medium Priority – Collect lead due to exceedances. Collect core parameters to represent at least 3 seasons during an assessment period.	

KEARNY LAKE	USE SUPPORT	OVERALL ASSESSMENT	
15050100 – 6666 8 Acres	A&Ww – Inconclusive FBC – Inconclusive FC – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 06/15/2000 – 01/07/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Mid Lake MGKEA - B 102552	AGFD Ambient	3-9 total metals only: Arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury nickel, silver, and zinc	4-9 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	5 Fluoride 9 Total dissolved solids
Boat ramp MCKEA - BR 102550	AGFD Ambient			
At inflow MCKEA - IN 102551	AGFD Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient *E. coli* bacteria, dissolved cadmium, copper, and zinc and total mercury to assess FBC, A&W, and FC		Lab detection limits for selenium and dissolved mercury were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority – Collect core parameters to represent at least 3 seasons. Use lower lab detection limits for selenium and dissolved mercury.	

LAKE PLEASANT 15070102 -- 1100 8000 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive FBC – Attaining FC – Attaining DWS – Attaining AgI – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 03/14/2000 – 09/24/2004		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam MGPLE -- A 100067	ADEQ and U of A Ambient	15-23 total and 7-10 dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, and zinc	35-45 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	3 *E. coli* bacteria 31 Fluoride 20 Total dissolved solids 26 Turbidity 10-15 Benzene, ethylbenzene, toluene, xylene
Mid lake MGPLE – B 100068	ADEQ and U of A Ambient			
At riverine zone MGPLE – C 101708	ADEQ and U of A Ambient			
Castle Creek arm MGPLE - CSTL 102554	AGFD Ambient			
Agua Fria arm MGPLE – AGUA 102553	AGFD Ambient			
At marina MGPLE – MAR 101000	ADEQ and U of A Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	11/26/2003 – 5.4 mg/L 09/24/2004 – 4.6 mg/L	Attaining – 2 exceedances in 15 sampling events (9 of 39 samples). (Binomial)
pH	<6.5 SU A&Ww, FBC, AgL	09/05/2001 – 10.5 SU	Attaining – Only 1 exceedance in 15 sampling events (2 of 45 samples) (Binomial)
Selenium	2.0 µg/L A&Ww chronic	05/29/2001 – 3.0 µg/L	Inconclusive – One exceedance during the assessment period.

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Ww chronic criteria in at least 8 samples.
FISH TISSUE MONITORING		Preliminary results indicate that a fish consumption advisory for mercury may be issued based on edible fish tissue results exceeding 0.3 mg/kg. Results from a second round of monitoring are currently being analyzed.	
MONITORING RECOMMENDATIONS		Low Priority –Use lower lab detection limit for selenium and dissolved mercury.	

LITTLE ASH CREEK From headwaters to Ash Creek 15070102 -- 039 17.7 Miles	USE SUPPORT	OVERALL ASSESSMENT	
	A&Ww – Inconclusive PBC – Inconclusive FC – Inconclusive AgL – Inconclusive	Category 3 Inconclusive	

MONITORING USED IN THIS ASSESSMENT				
SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING DATES: 04/18/2002		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Near Estler Peak MGLAS004.52 100578	ADEQ Ambient	1 total and dissolved: Antimony, arsenic, beryllium, cadmium, chromium, copper, zinc 1 total metals only: Boron, lead, manganese, mercury	1 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	1 *E. coli* bacteria 1 Fluoride 1 Total dissolved solids 1 Turbidity

EXCEEDANCES			
POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
No Exceedances			

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS			
EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
	Insufficient core parameters to assess designated uses	Insufficient monitoring events	Lab detection limit for selenium was higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Low Priority –Collect missing core parameters to represent at least 3 seasons during an assessment period. Use a lower lab detection limit for dissolved mercury.	

LYNX LAKE 15070102 -- 0860 50 Acres	USE SUPPORT	OVERALL ASSESSMENT	
	A&Wc – Attaining FBC – Inconclusive FC – Attaining DWS – Inconclusive AgI – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 04/25/2000 – 05/23/2002 NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
At dam MGLYN - A 100037	ADEQ and AGFD Ambient Weston, Inc Special Inv.	3-6 total and dissolved metals: Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, selenium, silver, and zinc	3-7 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	1 *E. coli* bacteria 8 Fluoride 2 Total dissolved solids 6 Turbidity
Mid lake MGLYN – B 100038	ADEQ Ambient			
At Lynx Creek inlet MGLYN – C 100039	Weston, Inc Special Inv			
At boat ramp MGLYN – BR 101399	ADEQ and AGFD Ambient			

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Lead	15 µg/L FBC	03/09/2001 – 53 µg/L	Inconclusive – 1 exceedance in 3 sampling events. (Binomial)
Manganese	980 µg/L DWS	04/25/2000 – 1073 µg/L 03/09/2001 – 2033 µg/L 04/29/2002 – 1280 µg/L 05/22/2002 – 2650 µg/L	Inconclusive – 4 exceedances in 5 sampling events. (Binomial requires a minimum of 5 exceedances and 20 samples to assess as impaired.)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Lead and manganese	Insufficient *E. coli* bacteria to assess FBC		Lab detection limit for dissolved mercury was higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority –Collect additional lead and manganese data due to the exceedances. Use lower lab detection limit for dissolved mercury.	

MARTINEZ CANYON	USE SUPPORT	OVERALL ASSESSMENT	
From headwaters to Box Canyon 15050100 – 080 9.5 Miles	A&Ww – Attaining FBC – Inconclusive FC – Attaining AgL – Attaining	Category 2 Attaining some uses	

MONITORING USED IN THIS ASSESSMENT

SITE NAMES ID # DATABASE #	AGENCY PURPOSE	SAMPLING PERIOD: 05/16/2002 – 05/27/2003		
		NUMBER AND TYPES OF SAMPLES		
		Metals	Nutrients – Related	Other
Below Martinez Mine MGMZC006.18 101349	ADEQ Ambient	5 total and dissolved metals: Antimony, arsenic, beryllium, cadmium, chromium, copper, and zinc 5 total and 0-1 dissolved: Boron, lead, manganese, mercury	5 samples: Ammonia, total nitrogen, nitrite/nitrate, total phosphorus, total Kjeldahl nitrogen, dissolved oxygen, pH	5 *E. coli* bacteria 5 Fluoride 5 Total dissolved solids 4 Suspended sediment concentration 5 Turbidity

EXCEEDANCES

POLLUTANT	STANDARD UNIT DESIGNATED USES	DATES EXCEEDANCES	DESIGNATED USE SUPPORT SUPPORTING EVIDENCE AND COMMENTS
Dissolved oxygen	6.0 mg/L A&Ww	05/16/2002 – 3.1 mg/L 11/20/2002 – 5.9 mg/L 03/26/2003 – 4.5 mg/L 05/27/2003 – 3.3 mg/L	Attaining – Low dissolved oxygen due to natural conditions of low flow and ground water upwelling. Flow between 0.01-0.05.
Lead	15 µg/L FBC	01/21/2003 – 25 mg/L 03/26/2003 – 40 mg/L	Inconclusive – 2 exceedances in 5 samples. (Binomial approach requires a minimum of 5 exceedances in 20 samples to assess as impaired.)

Pollutant: Assume "total" concentration, unless shown as dissolved.
Frequency Exceed = Samples collected within a 7-day period are aggregated and counted as one sample per site.

DATA GAPS AND MONITORING NEEDS

EXCEEDANCES NEEDING MORE SAMPLES TO ASSESS	MISSING CORE PARAMETERS	MISSING SEASONAL DISTRIBUTION	DETECTION LIMITS NOT LOW ENOUGH
Lead	Collected all core parameters		Lab detection limits for selenium and dissolved mercury were higher than A&Ww chronic criteria.
MONITORING RECOMMENDATIONS		Medium Priority –Collect additional lead data due to the exceedances. Use lower lab detection limits for selenium and dissolved mercury.	